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CONTENTS

EDITORIAL:

Editorial Notes	39
Australian Railways Agree on Standard Gage.....	40
The Reasons for and the Advantages of the New York Central-Lake Shore Consolidation	41
Repair Cars Now	43
New Books	44

LETTERS TO THE EDITOR:

The Roundhouse Foreman and the Road Foreman.....	44
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MISCELLANEOUS:

*Reconstruction of Kaw River Bridge; by C. E. Smith.....	45
The College Man and the Railroads; by Ivy L. Lee.....	49
*B. L. Winchell	51
Georgia Governor Denounces Labor Unions.....	52
System and Organization in Station Work.....	52
*Tests of Alcohol Heater Car.....	53
A City that Appreciates a Railroad.....	54
*The Minimum Efficient Gradient; by Paul M. La Bach.....	55
*Box Car for Grain and Coal Traffic.....	57
Railroad Cost and Efficiency.....	60
Transportation and Car Accounting Officers.....	60
Armour Favors Rate Advances.....	60
Proposed New Railroad Law in Maine.....	61
*Turntable Tractor	62
Foreign Railway Notes.....	44, 51, 53, 56, 58, 61, 63

GENERAL NEWS SECTION..... 64

*Illustrated.

A RECENT despatch from Montreal to the *Wall Street Journal* calls attention to the fact that the Canadian Pacific, after July 1, will have practically no funded debt, since it called for payment on that date \$35,000,000 first mortgage 5 per cent. bonds. The entire capital, with certain negligible exceptions, will consist of 4 per cent. debenture stock, 4 per cent. preference stock and common stock. Sir Thomas Shaughnessy is quoted as commenting on this fact as follows: "The Canadian Pacific is unique among railroads in that no foreclosure is possible." It is true that the Canadian Pacific is unique among railroads, both on the strength of its credit, its great earning power, its enormous assets and its absence of funded debt; but that it is not subject to foreclosure sale we doubt. It will be recalled that in the last reorganization, previous to the Morgan

reorganization in 1909, the Chicago Great Western was made "foreclosure proof," in that it had no funded debt. Receivership proceedings, however, do not necessarily need to be brought against a railroad company by a bondholder. A railroad company has creditors beside its bondholders. In the case of the Chicago Great Western, the receivership proceedings were brought by general creditors, and it is well to bear this fact in mind. In this connection it is interesting to note that the new Massachusetts railroad law, an abstract of which was published in these columns last week, recognizes, apparently, that the relation of the amounts of stock to the amounts of bonds outstanding is one that must be governed largely by market conditions for railroad securities. At least the new law provides that twice as great an amount of bonds may be issued as there is outstanding stock if the company finds it expedient to do so. The former Massachusetts railroad law provided that no greater amount of bonds could be issued than there was outstanding par value of stock.

THERE are some obvious fallacies and loose expressions in the discussion by Student, published elsewhere in this issue, on the old question of allocating expenses to passenger and freight service. On the other hand, this article takes a quite novel point of view and its shortcomings may well be overlooked for the sake of new light on an old subject. The author, accepting implicitly that value of service and not cost of service determines rates, argues that since a railroad is in business to earn money, its own expenses should be divided on a value of service basis rather than a cost of service basis.

THE scathing arraignment of labor union methods and policies by retiring Governor Brown of Georgia in his farewell message to the state legislature, which is published elsewhere in this issue, is of much interest to those who have observed the development of the methods which he attacks. The justice of his statements regarding the powers and ruthless aggressiveness of the "labor trust" cannot fail to appeal to many who have observed the activities and almost unvarying success of the labor lobby in promoting legislation for its selfish interests. This legislation usually is not only of no benefit to the public at large, but often directly opposed to its welfare. The justice of Mr. Brown's comments will also appeal to those who have noted how organized labor often has succeeded in forcing up its own wages at the expense of the unorganized workers and the public by the expedient of threatening to tie up commerce and industry unless its demands are granted. Additional significance attaches to these remarks because of their source. Mr. Brown is a politician who has heretofore succeeded by a policy of direct appeal to the masses on popular issues. It may be recalled that one of the principal features of his victorious campaign for the governorship against Hoke Smith was opposition to the policy of freight rate reductions which had been carried on by the Georgia railway commission while Mr. Brown was himself a member of that body. His fight was made on the proposition that the rate cuts had been absorbed by the shippers, thus preventing any direct benefit to the public in the form of reduced prices, and that they had indirectly injured the public by hindering railway development. During a period when politicians all over the country were climbing into office by anti-railway agitation Mr. Brown secured election by boldly taking an exactly contrary stand. There was then beginning and has since occurred a marked change in the attitude of the public on the subject of railway rates. Is Mr. Brown's present outspoken attack on labor unions another example of his keenness in sensing the beginning of a change in public sentiment—this time a change in sentiment regarding labor union tactics?

IN appointing a locomotive engineer and a summer resort proprietor to membership on the upstate public service commission, Governor Sulzer of New York degrades that commission to the low estate of a political body, like its predecessor, the

old railroad commission. The hotel keeper, Mr. Leffingwell, who also has other business interests, is appointed to please the democratic politicians, and the engineer, Mr. Chase, to please the labor unions. One of these men is to take the place of Chairman George W. Stevens, whose broad statesmanship, wide knowledge and intelligent devotion to the public interest have been praised on all sides. It is not too much to say that Stevens, and the other strong men appointed by Governor Hughes, six years ago, made that commission in many respects a model, setting up new standards which have been recognized throughout the Union. Governor Dix, in some of his appointments, and now Governor Sulzer, have done what they could to reverse Governor Hughes' policy, which was to get the most competent men to be found. The fallacy that a locomotive engineer or a conductor knows as much about railroad regulation as a chief engineer or a general manager is one that seems to be specially seductive with governors and presidents, as numerous appointments at Albany and other capitals, including Washington, have shown. It may be assumed that Mr. Chase is a good engineer and a thoroughly upright citizen—as good in these respects as could be found; free from prejudice in favor of labor unions and their vicious full-crew-law notions, and devoted with a single purpose to the public interest. All this may be granted, and yet the appointment condemned, for a most essential qualification for the commissionership is experience and knowledge in the broad field of public regulation, and acquaintance with railroad operations in all departments. It is to be expected that a man who has been running a locomotive for 20 years will have many of these things to learn; and they are not quickly acquired.

JUST eight years ago the American Railway Master Mechanics' Association was awakened by George M. Basford to the necessity of giving more attention to the training of apprentices and of placing apprenticeship on a new and modern basis. It is doubtful if at that time there were more than half a dozen apprentice instructors on the railroads in this country, and, without doubt, none of the school room instruction was given during working hours. Today there are about two hundred apprentice instructors on the railroads of this country, approximately one-half of them giving practical instruction in the shops, and the other half giving technical instruction in the class room and closely co-operating with the work of the shop. Most of the class room instruction is given during working hours. This result, accomplished within a space of eight years, is indeed gratifying, but is not nearly so extensive as it should be. The problem of recruiting the ranks of railroad service is a most serious one, and while those roads which have done such splendid work are to be congratulated, it is unfortunate that so few have awakened to their responsibilities in this matter. The industrial supremacy of this country promises to be seriously handicapped because of the lack of skilled workmen, and the railways must suffer if they fail to do their part in developing such workmen. Those roads which have adopted modern apprenticeship methods must guard more carefully against one thing; the object of these methods should be to develop skilled workmen and not to provide leaders. This is most forcibly emphasized in the address which was presented before the Santa Fe apprentice instructors' conference by Mr. Basford, and which was published in last week's issue. Entirely too much attention is being given on some roads to teaching the apprentices mechanical drawing. If carried too far this is liable to make them dissatisfied with their work in the shop and to cause them to leave the shop for the drafting room. We have too many poor draftsmen now, and the young men should be discouraged from entering this work until they have had a very complete practical training, together with the necessary technical instruction. Only enough drawing should be taught in the apprentice class room to enable the boys to make proper use of the blue prints which they must follow in the shop and to make rough sketches from which to work. If any of them have serious leanings toward entering the engineering profession, they should make the necessary arrange-

ments to become more proficient in making mechanical drawings outside of the apprentice class room.

FOR a shining example of pure wantonness on the part of the labor leaders and their friends, the weak-kneed legislators, the action of this year's Massachusetts legislature, in regulating the working hours of street and elevated railway employees, should easily take first place. The governor of that state has not been particularly noted for broadminded statesmanship, but he vetoed this bill in a message setting forth some very salutary truths. It became a law, however, by a large majority, in spite of the veto. The employees referred to, including gatemen, must not be required to work more than nine hours a day, and this work time must come within a period of eleven consecutive hours; but nothing in the law shall prevent an employee, if he so desires, from working longer hours. The penalty for each offense is from \$100 to \$500. In other words, the company, if it requires a man to work for 10 hours a day, is a criminal, while the employee himself may work any number of hours without molestation. A law limiting the working period to nine hours, the work to be performed within 12 hours, was already on the books. It went into effect January 1, 1913; and eight days thereafter the labor leaders put in their petition for the change which has now been made; and this notwithstanding that there was a tacit understanding among both employers and employees, that the former law, which had been passed in April, 1912, should be left in effect a sufficient time to allow satisfactory details to be worked out. The justification for this kind of legislation rests on the principle that the state must conserve the health and general welfare of its citizens; but no such argument can be brought in behalf of this law, for the employee himself may flout it at will. Governor Foss says that "those who advise the working men of Massachusetts in respect to these repeated demands, are rapidly defeating their own purposes, and injuring the true interests of labor in Massachusetts by forcing their always increasing requirements faster than economic conditions justify. Making new demands, and with so little reason, upsets the schedules of all the corporations concerned, puts them to added expense, and serves to discourage the investment of capital in these corporations."

AUSTRALIAN RAILWAYS AGREE ON STANDARD GAGE.

SOME of the early experiences of the railways in the United States in their efforts to obtain a uniformity of gage are recalled by a similar agitation through which the government-owned railways of Australia have recently been passing. The engineers-in-chief of all the Australian main line state railways have finally decided unanimously for the adoption of the standard 4 ft. 8½ in. gage throughout the continent. Apparently it is easier for privately owned railways to get together in an agreement on a subject of such vital importance than for railways owned by governments. Railways were built in Australia almost as early as in this country, but a standard gage was adopted in the United States as long ago as 1886, while in Australia the gage question has been a subject of controversy since 1846, without an agreement having been reached until this year.

The necessity for uniformity in Australia has long been recognized, but there has been great difficulty in securing an agreement, and particularly in deciding between the merits of the 4 ft. 8½ in. gage used in New South Wales, and the 5 ft. 3 in. gage used in Victoria and a part of South Australia. After deliberation extending over several months the 4 ft. 8½ in. gage was adopted as standard, the total cost of the change, including alterations to rolling stock, being estimated at \$180,245,400. This compares with an estimated cost of \$250,550,000 for the 5 ft. 3 in. gage. According to the estimates the change will cost \$61,000,000 for the railways of Queensland; \$50,000,000 for the railways of West Australia, \$29,195,000 for South Australia; \$29,667,450 for Victoria; \$6,212,850 for Commonwealth territory, and \$472,000 for New South Wales. As a preliminary

step, however, it is suggested that \$57,886,700 should be first spent on securing complete uniformity for the through lines from Fremantle to Brisbane, including the Trans-Australian Railway. This will involve an outlay of \$29,667,450 for Victoria; \$13,434,500 for West Australia; \$10,834,600 for South Australia; \$4,365,000 for Queensland and New South Wales.

The engineers strongly urge that the work of conversion be begun at once on the ground that the cost will increase if the matter is further delayed, on account of the large mileage of railway now proposed to be built. It is said to be possible that the financing will be undertaken by the Commonwealth as the plan is for the benefit of the whole continent, because, although the lack of agreement among the states is the reason for the necessity of such a heavy expense now, the burden would be severe on some of the states while New South Wales, the richest of them all, would have little to pay because its lines have been built to the standard gage.

The present mileage of different gages in the various states are shown in the following table:

State or Line.	2 ft. 6 in. Miles.	3 ft. 6 in. Miles.	4 ft. 8½ in. Miles.	5 ft. 3 in. Miles.
New South Wales.....	...	...	3,760	...
Victoria	122	...	...	3,401
Queensland .....	...	4,287	...	...
South Australia .....	...	835	...	622
Western Australia .....	...	2,375	...	...
Northern Territory .....	...	145	...	...
Port Augusta-Oodnadatta .....	...	478	...	...
Totals	122	8,120	3,760	4,023

The varying gages that have prevailed on the railways of the different Australian states since their construction have naturally had a vital effect on the character of the business of the roads, and as a result of the impediment to the interchange of traffic the railway system of each state has served mainly local purposes instead of forming part of a network promoting the welfare of Australia as a whole. Because of the difference of gage it has been practically impossible to use the rolling stock of one state on the railways of another. This has necessitated the transfer of passengers and the reloading of freight at the borders, and prevented the full development of the use of the rolling stock, since under a system of interchange there would not be the same necessity for each state to provide fully for times of abnormal traffic. It has sometimes happened that cars have been idle in one state, yet could not be used to relieve a shortage in another. The necessity for transfer has naturally added to the expense of transportation, and charges have been made to cover the cost of transfer of freight and added to the ordinary rates. The break of gage has also caused delays and increased congestion on the single track lines of the state railways, because at times when the interstate traffic was mainly in one direction a train of full cars taken to the border often had to return empty, while a train often had to be run empty to the border on the other side in order to receive the freight brought on the first train, in addition to the congestion caused at the transfer point by the reloading itself.

In connection with the projected transcontinental line from Kalgoorlie to Port Augusta, which would have made possible a total journey of 4,000 miles, it was recently stated that passengers would have to change cars at least five times, owing to the difference in gage, and all baggage, mail and merchandise would have to undergo a similar transfer.

As long ago as 1846, Mr. Gladstone, then Colonial Secretary, recommended that the 4 ft. 8½ in. gage, the standard in Great Britain, should be adopted throughout the continent. In 1850, however, the engineer of the Sydney Railroad and Tramway Company strongly advocated the adoption of the 5 ft. 3 in. gage, and in 1852 an act was passed making the wider gage compulsory on all railways constructed in New South Wales. The company, having changed its engineer, changed its views as to the gage, and in the following year succeeded in having the law changed to provide for the narrower gage. This step was taken without the concurrence of the other states concerned, and as in Victoria the private companies had already placed large orders

for rolling stock to fit the 5 ft. 3 in. gage, it was decided to adhere to 5 ft. 3 in. as the standard gage for Victoria, while the Sydney Railroad and Tramway Company proceeded with the construction of its lines on the 4 ft. 8½ in. gage. These two gages have since been adhered to as the standards of the respective states. Queensland later adopted a 3 ft. 6 in. gage as best suited to its own conditions. Other states followed the practice of Victoria or the Sydney company, while in recent years light railways have been constructed in Victoria to a gage of 2 ft. 6 in. As long as the railways in the different states were required to serve purely local purposes only, the differences of gage were a matter of slight concern, but long after interchange traffic had developed differences of opinion as to the best gage, and the question of who should pay the expense of the alteration deferred any action in the matter.

Prior to the year 1886 the greatest diversity existed in the gages of the American railways. They included gages of 6 ft., 5 ft. 6 in., 5 ft., 4 ft. 10 in., 4 ft. 9 in., 4 ft. 8½ in., and some others. The expense and inconvenience of transshipment became a matter of grave concern and many plans were experimented with in the way of transferring car bodies to trucks of different gages. Even this had such serious disadvantages, however, that a conference of presidents held in the summer of 1885 came to the conclusion that the only effective solution was to establish a uniform gage, and it was decided to make the change in the following year. A conference of general managers in February, 1886, decided on 4 ft. 9 in., but that railways built to the 4 ft. 8½ in. gage should make no change, and the latter has since superseded the slightly wider gage agreed upon.

THE REASONS FOR AND THE ADVANTAGES OF THE NEW YORK CENTRAL-LAKE SHORE CONSOLIDATION.

IT might be expected that the reasons for the proposed consolidation of the New York Central & Hudson River and the Lake Shore & Michigan Southern would be found either in advantages to be gained from an operating standpoint or in the immediate provision of new capital. An analysis, however, of the consolidation plan indicates that while the advantages are probably financial rather than operating, it is not a plan for immediately raising new capital, but rather a farsighted attempt to provide for future comprehensive and inexpensive financing.

The New York Central & Hudson River itself has outstanding two important large issues of long term bonds. These are the \$94,000,000 refunding mortgage (now first) 3½ per cent. bonds maturing 1997, and about \$57,000,000 4 per cent. debenture bonds.

The mortgage securing the first 3½'s authorizes a total issue of only \$100,000,000; the mortgage covering by a first lien 801.98 miles of road, chiefly the main line between New York and Buffalo. The mortgage also covers the leasehold rights of the New York Central in practically all the leased and controlled lines east of Buffalo. The debenture 4's are an obligation of the road subject to the first 3½'s, but with the provision that they shall be included ratably in any subsequent mortgage placed on the property.

In addition to these two major issues of bonds, the New York Central & Hudson River has outstanding \$90,578,400 collateral trust guaranteed 3½ per cent. certificates, which are a direct and first lien, at the rate of \$200 bonds to \$100 stock, on the majority outstanding Lake Shore & Michigan Southern stock; and the New York Central & Hudson River also has outstanding \$19,336,000 collateral trust guaranteed 3½ per cent. certificates secured by direct and first lien, at the rate of \$115 bonds to \$100 stock, on the majority outstanding Michigan Central stock. The indentures securing the Lake Shore and the Michigan Central collateral 3½'s are drawn in such a way as to protect the bondholders even, it would seem, at the expense of the railroad company; and by "expense" is meant that the agreement is so ironclad as to hamper the raising of new money at the

cheapest possible rate. These indentures, it is believed, are a liability of the N. Y. C. senior to the indenture securing the New York Central & Hudson River debenture 4's themselves.

The New York Central-Lake Shore collateral indenture provides that no future mortgage can be placed on the New York Central property without extending the lien of such mortgage to include these collateral bonds and making the lien of the collateral bonds prior and superior to the lien in favor of any other bonds or debt secured by the mortgage, excepting that \$22,000,000 bonds might be issued which would be secured equally with the Lake Shore collateral bonds. The obvious intention of the \$22,000,000 authorization was to include the New York Central-Michigan Central 3½'s as an equal lien with the Lake Shore collateral 3½'s on the property of the New York Central. The New York Central-Lake Shore collateral indenture also provides that with the consent of 75 per cent. of the holders of that issue, the Lake Shore & Michigan Southern might be merged with the New York Central, but in that event the collateral trust 3½'s should be immediately secured by a lien on the property of the Lake Shore & Michigan Southern, this lien to be as full and complete as that upon its shares of capital stock.

The New York Central & Hudson River refunding 3½'s are, of course, legal investments for savings banks in New York.

The New York savings bank law provides that no bonds issued under refunding mortgages can be available as an investment for savings banks unless the mortgage in question covers mileage at least 25 per cent. greater than that covered by any prior mortgage. While it is true that the 3½'s are now a direct lien on only about 800 miles of the system east of Buffalo, the New York Central has recently merged with itself companies owning mileage aggregating some 937 miles additional; these properties having been formerly controlled through leasehold. The lien of the New York Central refunding mortgage 3½'s will automatically attach to this newly acquired property, and a meeting of the New York Central stockholders had already been called to take the necessary legal steps. It, therefore, seems plain that a new refunding mortgage could be created covering only the lines east of Buffalo which would meet the requirements of the New York savings bank law, as the mileage covered would not be 25 per cent. greater than that already subject to the refunding 3½'s.

The New York Central & Hudson River has outstanding about \$100,000,000 short term notes. Of course with the bond market in the condition it is at present it would be difficult to refund these notes with long term securities, even if the N. Y. C. had securities of the very highest grade to offer; but we may assume that the bond market will in the not very distant future begin to improve. It would then be of obvious advantage for the N. Y. C. to have a security which it could offer to New York savings banks.

Under the proposed consolidation plan there is to be authorized an issue of new refunding and improvement mortgage bonds, secured by a mortgage on the entire New York Central-Lake Shore system. These bonds, it is thought, will be a legal

investment for New York savings banks, because with the inclusion of the Lake Shore under the new refunding mortgage the 25 per cent. new mileage clause of the New York law will be fully met. L. Von Hoffmann & Co., New York, have had White & Kemble prepare a very interesting mortgage map showing the liens of the various bond issues under the proposed plan of consolidation. Accompanying this map is a discussion of the changes in position of the various security holders if the consolidation plan is carried out. Included in this discussion is the accompanying table showing the changes in the liens of the present bonds if the proposed plan is carried out.

Under this proposed plan no new capital will be raised in the process of the consolidation. After the consolidation, however, has been effected the New York Central will have a mortgage on the entire N. Y. C.-L. S. & M. S. system under which it is proposed to issue ultimately some \$500,000,000 bonds.

Assuming that the Von Hoffmann analysis is correct, holders of the New York Central prior liens will not be affected one way or the other by this consolidation plan, except that their bonds become a direct obligation of the parent company while retaining the same mortgage lien which they have always possessed.

Holders of the first 3½'s will apparently be put in a better position since their bonds will remain in the same relative position to the rails that they are now on 800 miles, and will be a direct lien instead of a lien on the leasehold estate of the additional 937 miles going to make up the lines east of Buffalo. Furthermore, they will derive the advantages of the additional equities provided from the sale of new refunding and improvement mortgage bonds. On the other hand, of course, there will be outstanding as soon as any of these new refunding bonds are issued more N. Y. C. bonds that are legal investments for savings banks.

The holders of New York Central debenture 4's which now are not secured by mortgage on any property will be secured by a mortgage—junior, it is true, to that of the non-exchanged Lake Shore collateral 3½'s and the Michigan Central collateral 3½'s—on nearly 1,800 miles of road.

This subordination to the Lake Shore collaterals and Michigan Central collaterals has always existed, however, as the indentures securing the two last named issues, drawn in 1898, specifically provided for the ultimate securing of the collateral bonds by a mortgage on the New York Central, and the indenture securing the New York Central debentures, of which the first outstanding issue was made in 1904, was drawn in recognition of what might be termed a prospective mortgage already on the property, in addition to the lien of the refunding 3½'s. Upon the consummation of the plan, as proposed by the New York Central, the holders of New York Central-Lake Shore collateral 3½'s may either retain the bonds which they own, secured by a lien on the New York Central jointly with the Michigan Central collaterals, subject to the first 3½'s and prior to the debentures and all other issues, and further secured by a mortgage on the Lake Shore property, subject only to the 3½'s and debentures and prior to all other issues, or, if they wish, they may exchange their 3½ per cent. bonds for 4 per cent. bonds, which will rank on the combined mileage 1 deg. lower in point of security, that is, on a parity with the New York Central debentures on the mileage east of Buffalo and junior to the unexchanged collaterals on the mileage west of Buffalo.

Holders of Lake Shore prior lien bonds will not be affected, and holders of the debenture 4's of the Lake Shore will get a junior mortgage on 826 miles, whereas they now have no mortgage security.

If the holders of Lake Shore collateral 3½'s could now exchange, even at some future time, their bonds for Lake Shore stock at 200, it is doubtful if they would consent to an exchange of their present 3½ per cent. bonds even for a 4 per cent. bond. The indenture, however, makes no provision by which these collateral security holders can get at the Lake Shore stock. In case of default, the Lake Shore stock must be sold in its entirety

Bond.	Mileage previously covered.	Mileage covered under proposed plan.	Rate per mile on mileage covered.
New York Central prior liens.....	Unchanged	Unchanged	\$31,850
New York Central first 3½'s, 1997.....	801.98	1,739.45	54,040
New York Central unexchanged Lake Shore collaterals.....	None	2,670.25	\$*8,480
New York Central Michigan Central collaterals.....	None	1,844.35	\$10,484
New York Central debenture 4s.....	None	1,844.35	\$31,009
Lake Shore & Michigan Southern first 3½'s, 1997.....	Unchanged	Unchanged	60,540
Lake Shore & Michigan Southern debenture 4s.....	None	825.90	121,080
New 4s issued in exchange for Lake Shore collaterals.....	.....	2,670.25	*\$25,441

*Based on exchange of 75 per cent. of Lake Shore collaterals.

†Bonds marked thus are secured by equal liens on property now of New York Central.

‡Bonds marked thus are secured by equal liens on property now of New York Central.

for the benefit of the collateral security holders, unless the holders of 75 per cent. in amount of the bonds outstanding instruct the trustee in writing to dispose of the stock in parcels. Since, then, even if the Lake Shore stock was worth intrinsically a good deal over 200 per share, there could be but few bidders for \$45,000,000 of it, the present plan, therefore, does not take away apparently any very real asset from the collateral $3\frac{1}{2}$ per cent. bondholders, as it secures to them a lien upon the Lake Shore property at least equal to that which they now possess through the pledge of Lake Shore stock. It is also important to note that the issuance by the Lake Shore & Michigan Southern of additional debenture bonds, which would rank ahead of the pledged stock, is terminated by the plan under way, so that while under former conditions it might have been theoretically possible to increase the amount of bonds prior to the stock, the position of the collateral bonds is now definitely determined and cannot be changed. This same argument holds true in regard to the Lake Shore debenture 4's as the plan effectually prevents the issuance of additional bonds on a parity with them. The plan has also the obvious attraction of giving to the holders of New York Central-Lake Shore collateral $3\frac{1}{2}$'s who consent to the proposed merger, and who elect to make the exchange offer a security yielding them 4 per cent. instead of $3\frac{1}{2}$ per cent.

Summed up, then, the gist of the reasons which led to the adoption of the consolidation plan of the Lake Shore & Michigan Southern and the New York Central & Hudson River is as follows: The present arrangement of the New York Central's debt would not permit of a refunding bond issue covering only the lines east of Buffalo which would be legal for New York savings bank investment. The Lake Shore collateral indenture hampers the raising of new capital for that property.

In order to merge the two properties and secure the increased mileage necessary for the creation of a savings bank mortgage, the consent of 75 per cent. in amount of the Lake Shore collateral $3\frac{1}{2}$'s becomes necessary, and to secure that consent the inducement of $\frac{1}{2}$ per cent. additional income has been offered to the holders of the Lake Shore collateral $3\frac{1}{2}$'s. By consolidation of the two properties and the exchange of Lake Shore collateral bonds for a new security, a comprehensive refunding mortgage may be created under which new capital for both properties may be raised and which, it is probable, will secure the largest authorized issue of bonds that has ever been created on an American railroad.

REPAIR CARS NOW.

THERE may be a car shortage again next fall, and it may be worse than the car shortage of last fall. There are, of course, a good many things which can be done which will tend to postpone or mitigate such a shortage. There is one thing, however, which should be done at once. A start should be made now to reduce the number of cars in shops. Last year the start seems to have been made a little too late, and as a result, there was a larger percentage of cars in shops in October and November, 1912, than there need have been. The figures are instructive.

The statistical bulletins of the American Railway Association show that the percentage of cars in shops increased up to and including last July. We all know that strenuous measures were then taken to put as many cars in good repair as possible. As a result the percentage was brought down to 6.36 in October, 6.22 in November, and 6.00 in December. It would have been much better if the minimum had been reached in October, as even the fractional difference between October and December meant a difference of seven or eight thousand cars in service. Should not an early start be made this year with car repair work, with the idea of coming down to the minimum in October?

This raises the question, what standard should be aimed at? There is a general feeling that 5 per cent. of the cars in shops is about right, and this would seem to be confirmed by the Amer-

ican Railway Association figures, which show 5.02 as the lowest percentage on record. This was achieved in the first three months of the year 1907, immediately after the great car short-

PERCENTAGE OF FREIGHT CARS IN SHOPS.

American Railway Association Statistical Bulletins.	American Railway Association Car Location Bulletins.
1912.	1912.
April 6.36	
May 7.39	
June 7.79	
July 7.92	
August 7.21	
September 6.84	
October 6.36	
November 6.22	
December 6.00	
1913.	1913.
January 6.49	
February 6.17	
	Nov. 30 6.04
	Dec. 14 5.68
	31 6.12
	1913.
	Jan. 15 6.15
	Feb. 1 5.77
	15 5.90
	Mar. 1 6.04
	15 6.05
	Apr. 1 6.28
	15 6.24
	May 1 6.67
	15 6.93

age of 1906. If this figure can be reached this fall this alone will make available perhaps 30,000 more freight cars than were available last year. Below is a comparison of the percentages of cars in shops for the first three months of 1907 and for October, 1912, divided up by groups:

PERCENTAGE OF FREIGHT CARS IN SHOPS.

		First three months of 1907.	October, 1912.
Groups—			
1.	New England	2.18	7.37
2.	N. Y.; N. J.; Del.; Md.; Eastern Pa.	5.54	5.19+
3.	Ohio; Ind.; Mich.; Western Pa.	5.40	8.19
4.	Va.; W. Va.; N. C.; S. C.	7.05	6.43+
5.	Ky.; Tenn.; Ga.; Ala.; Miss.	3.66	8.15
6.	Ia.; Ill.; Wis.; Minn.; Dakotas.	4.12	6.66
7.	Mont.; Wyo.; Neb.; Dakotas.	5.24	6.13
8.	Kans.; Colo.; Okla.; Mo.; Ark.	6.16	7.94
9.	Texas; Louisiana; New Mexico.	4.20	4.89
10.	Ore.; Idaho; Nev.; Cal.; Arizona.	4.70	4.73
11.	Canadian Lines	5.11	5.54
	Mexico	3.05	....
	Average	5.02	6.36

There are two satisfactory points about this comparison. One is that an improvement was made in the Trunk Line group, which owns nearly one-third of the cars. The other is that the South Atlantic group, which made the worst showing in 1907, did much better in 1912. In all the other groups there were more freight cars in shops last October when they were badly needed, than there were at the same time five years ago.

It is by no means unusual to have the percentage of cars in shops smaller in December and November than in October. This was the case in 1909 and 1910. The car location bulletins (which have been issued only this year) give percentages a little lower than those in the statistical bulletins; but they would seem to show that, while in April the roads did about the same as last year, they did a little better in May. If a start is made promptly in July, it ought to be easy to get a month or two ahead of last year's figures; and if the repair work in the shops is thoroughly done, it will so permanently improve the cars that there will be no wasteful expense, even if a car shortage does not come.

A reduction of the number of cars in shops will give the statistician a gratifying little by-product. The figure showing the average mileage per car per day which reached its maximum, 26, last October and November is based on all cars in the country, including those in shops. If the number of cars in shops is reduced and the movement maintained on those out of shops, the average miles per car per day will show a gratifying improvement. There are many other opportunities, of course, for improving this figure by a reduction of delays, especially in yards, but this is another story, and can be attended to later. The thing which should be done today is to use every effort to put the freight car equipment in good condition.

NEW BOOKS.

Railway Signal Engineering. By Leonard P. Lewis, of the Caledonian Railway (Scotland). Cloth, 376 pages, 5¼ in. x 8¾ in.; 250 drawings. Published by D. Van Nostrand Company, 25 Park Place, New York. Price, \$3.50.

Mr. Lewis is a lecturer at the Glasgow and West of Scotland Technical College, and his book is one of a series entitled "The Glasgow Text Books of Civil Engineering." It has the merits and demerits of a lecture-manual; though the only reason why we mention demerits is the absence of local references. Of all the drawings that we have examined not one has any indication of place or time; and of "local color," so much appreciated by American readers, there is very little. References to new or unknown devices or methods of working are only partially satisfactory when they give no hint of how many or what railways or signal engineers have added or tried them. To say that a new device is "on the market," with no inkling of any impartial person's opinion of it or whether it is worth trying, also makes filling for the pages of a book which is of doubtful quality.

But these are minor points. The book treats of the details of British signaling very fully, and the writer has the distinctive merit of the tutor; he aims constantly to answer the reader's questions, and with marked success. He does not touch power interlocking, nor is there a word about automatic block signals; but in the mechanical field the treatment is thorough and careful, and any railway man, whether interested particularly in signals or not, can find here a great mass of information about current English practice, concisely set forth. On this book the printer and the bookbinder have done an excellent job.

The first chapter gives a few very brief notes on early types of signals. The titles of the other chapters are as follows: Board of Trade rules; Classes and uses of signals; Constructional details; Point connections; Interlocking apparatus; Signal cabin arrangements; Miscellaneous apparatus; Signaling schemes; Interlocking tables (locking sheets, etc.) and Methods of working trains. Under miscellaneous apparatus there is a brief notice of track-circuit locking. "Interlocking tables" fill 40 pages, the chapter going very fully into the fundamentals of interlocking theory and practice.

Solution of Railroad Problems by the Slide Rule. By E. R. Cary, professor of railroad engineering and geodesy, Rensselaer Polytechnic Institute. Size, 4 in. x 6 in.; 136 pages; cloth binding; 43 illustrations and numerous tables. Published by D. Van Nostrand Co., New York. Price, \$1.

The "Solution of Railroad Problems by the Slide Rule" is the outgrowth of a series of problems which were developed by the author for classroom work. On account of the ease and rapidity with which such problems can be solved with the slide rule it is in very common use, and such a book as this should be of value to students and young graduates in pointing out the easiest methods of handling such computation. In addition to a discussion of the construction of the slide rule, the book includes chapters on simple curves, compound curves, vertical curves, turnouts, easement curves and earthwork.

The Science of Burning Liquid Fuel. By W. N. Best. Illustrated. Bound in cloth. 153 pages, 6 in. x 9 in. Published by the author at 11 Broadway, New York, N. Y. Price \$2.00.

The author has devoted a great deal of time to the use of fuel oil and has endeavored to make this book thoroughly practical. Analyses of oils from different localities are given and a chapter on atomization gives illustrations and descriptions of different oil burners. The systems in use for burning oil as fuel are dealt with and locomotive, stationary and marine applications are described, while considerable attention is given to ovens and furnaces. In this book there are a large number of illustrations.

Letters to the Editor.

THE ROUNDHOUSE FOREMAN AND THE ROAD FOREMAN.

NEW YORK, June 28, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with interest your editorial of this week on the making of locomotive engineers, and more particularly what you say about the number of men that can be supervised by a single road foreman. The suggestion that 100 men is too large a number touches on a matter which ought to have more attention than it now receives. While your declaration points in the right direction you have left a good deal unsaid. How can a single foreman supervise 100 men, even under the most favorable circumstances? On roads where the traffic is dense and the locomotive districts are short it may be possible, but I seriously doubt it; and where the road foreman has, as is quite customary, the enginemen on two or three districts under his charge he invariably has more work than he can handle. There are times when a road foreman has to spend three or four days in succession holding investigations with the trainmaster or the superintendent; at such times, unless he has an assistant, there is no one out on the road looking after the enginemen, and in all probability another set of investigations is developing while he is engaged in cleaning up the first set.

I know of numerous cases where enginemen do not have the road foreman on the locomotive with them once in six months. Some of them do not need his visits, but more of them do. It is only by constantly watching and checking up men that bad practices will be eliminated; and even the best enginemen, if not in touch with the road foreman, at least some of them, will frequently fall back into slipshod ways. The road foreman of engines is at present too much of an investigator and corrector of matters which are history; his main duty should be the education of his men along lines which will keep them (and the company) out of trouble; and he cannot accomplish this satisfactorily when his jurisdiction covers too much territory and too many men.

The placing of young enginemen on passenger trains is something which requires great care in the handling. I have known enginemen who could handle a passenger train well the day they were passed as engineers; and others who would never, with any amount of experience, make a good job of handling anything but a switch engine. When I was first placed in charge of an engine house I was cautioned by the master mechanic against using inexperienced men on passenger runs and told that if at all in doubt as to a man's ability I should not hesitate to run a more experienced man around him. It requires courage on the part of an engine house foreman or an engine dispatcher to take such a step, for it invariably results in a stormy time with the man who thinks he is wronged and possibly also involves payment of run-around mileage. However, if a foreman uses good judgment I believe he will always find his superiors back of him; and looking back on a great many cases of this kind I can think of none where the man went to the grievance committee of the brotherhood. Some of the men I had to deal with were of that kind which would never make competent passenger men. Others merely lacked experience, and after a sufficient number of trips on passenger trains, accompanied by the road foreman, if the latter informed me that they were competent to handle a passenger locomotive, I never hesitated in the future in calling them for such work in their turn.

ENGINE HOUSE.

TERMINAL FOR BAHIA BLANCA, ARGENTINA.—The Argentine Railway has purchased for \$1,000,000 a large site in Bahia Blanca for a terminal station.

RECONSTRUCTION OF KAW RIVER BRIDGE.*

Old Spans Were Moved Transversely and Endwise and Another Span Added. Unusual Method Used to Move Structure.

By C. E. SMITH,
Bridge Engineer, Missouri Pacific.

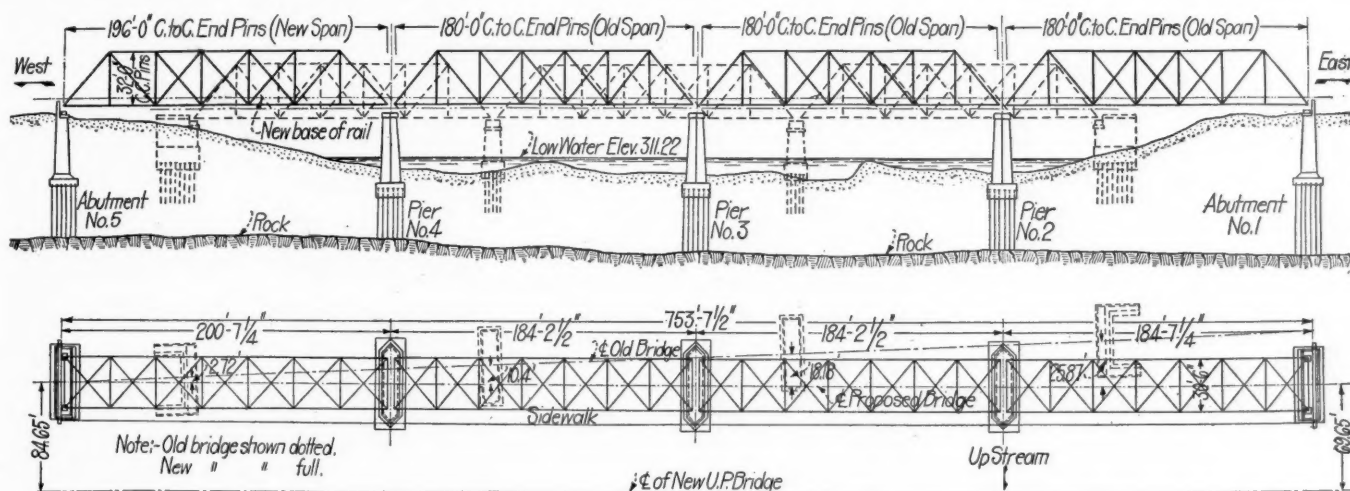
The Kaw, or Kansas river, is the third largest tributary of the Missouri, entering that stream at Kansas City. The watershed of the Kaw extends westwardly about 500 miles and has a drainage area of about 60,000 sq. miles. The capacity of the channel near the mouth is about 150,000 cu. ft. per second, which is equivalent to about 0.1 in run-off per day from the watershed. In May, 1903, the normal rainfall of $4\frac{1}{2}$ in. for the month fell in the first 21 days, followed by $8\frac{1}{2}$ in. in the next 10 days. This great flood caused the river to overflow its banks and to fill the entire valley from bluff to bluff for 150 miles above the mouth at depths ranging up to 20 ft. For a distance of about 17,000 ft. above its mouth the river passes through the thickly settled business portion of Kansas City, Kans., containing stock yards, railroad yards and wholesale houses. In this distance the river was crossed by 14 bridges, and there were three more a short distance up stream. The channel had been narrowed by refuse dumped in the stream by the industries along the bank and the waterway had been still further reduced by rip rap placed around the bridge piers for protection against scour.

FLOOD CONDITIONS.

The main line of the Missouri Pacific crossed the river on a double track structure about 100 ft. below a similar bridge of the Union Pacific. Each of these bridges consisted of three 180

cover the cost of these improvements. It was decided to build levees to protect the banks, to increase the width of the channel, to dredge the channel to at least 15 ft. below low water, and to limit all bridges to two river piers 300 ft. apart founded on rock. As practically all of the bridges had been rebuilt in 1903 and 1904, most of the bridge owners, including all the railroads, offered to reconstruct their bridges on new piers and abutments which would allow the use of present trusses with the understanding that they would join in the expense of widening the river at bridge crossings to provide such additional width as would be occupied by additional piers. The owners also objected to the requirement that piers be founded on rock and in the case of the U. P. and M. P., both of these matters were finally settled by the courts in favor of the owners. The reconstruction of these bridges was delayed several years by two overhead bridges at the west end of the river crossing maintained by the Kansas City Southern and the Stock Yards Company. The clearance under these bridges being approximately 21 ft., it was impossible to make the raise in the U. P. and M. P. bridges called for by the proposed reconstruction. In the spring of 1910 the river bridges were each raised $2\frac{1}{2}$ ft., which was as far as they could go without interference with the overhead bridges.

The new Missouri Pacific bridge was designed to use the



Plan and Elevation of New and Old Bridges.

ft. double track truss spans resting on masonry piers and abutments. When it was realized that the flood of May, 1903, would go over the decks of the bridges it was decided to weight them down with cars and locomotives. The drift which was caught by the Union Pacific bridge forced the spans from their supports and the trusses with their cars and the drift that had accumulated swept under the Missouri Pacific bridge. This formed almost a solid dam across the river so that the water passed over the tops of the locomotives standing on the latter bridge. In spite of this the bridge remained intact, being the only one of the 17 at this point that did not go out.

After the 1903 flood the war department appointed a board of engineers to make recommendations for the improvement of the river, and by an act of legislature the state of Kansas created the Kaw valley drainage district with power to issue bonds to

three old trusses, each 180 ft. long, which had been built for a loading of Cooper's E-50 in 1900. The additional width of the river necessitated the addition of a 196 ft. span. As 734 ft. was the adopted width of channel between the tops of levees, the total length of the bridge was made 742 ft. to compensate for the width of the third pier. A change in alignment was also necessary since a sharp reverse curve had been laid out at the east end of the bridge since its construction which would have been made worse by extending the bridge at that end on its old alignment. The west end of the bridge was fixed by conditions which prevented any large side movement so that the alignment finally chosen was 3.4 ft. up-stream at the west end and 26.3 ft. at the east end. It was decided to treat the three spans as one structure and move the entire bridge at one time. This decision was reached largely on account of the necessity of keeping the bridge in almost continuous service during the reconstruction. The contract for the foundation work was let to the Union

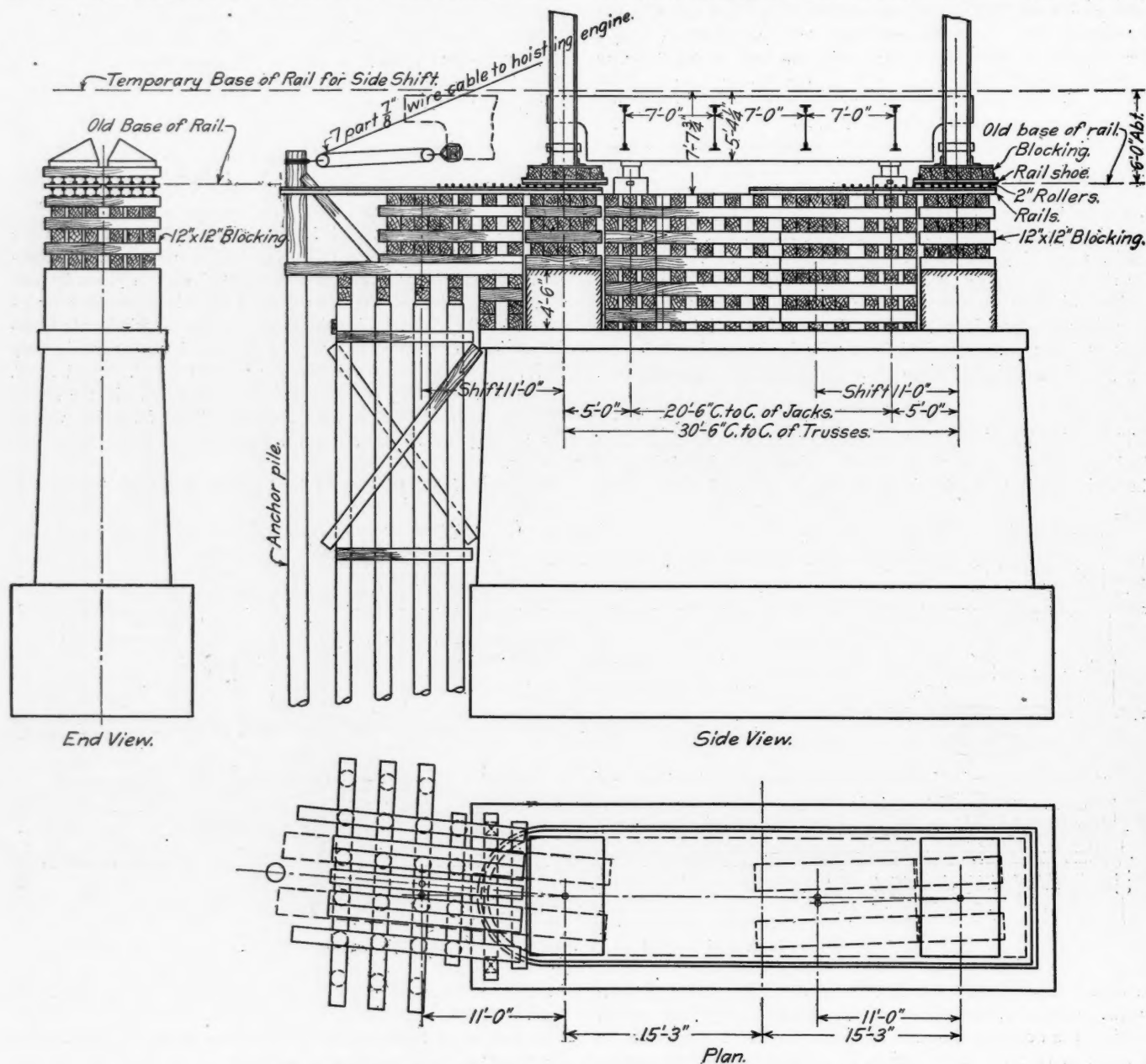
*Abstract of a paper presented before the Associated Engineering Societies of St. Louis, May 7, 1913.

Bridge & Construction Company, Kansas City, Mo., on a force account and fixed fee basis, this method of payment being adopted on account of the presence in the channel under the old bridge of large quantities of old bridge iron, cars and other debris that had been deposited there in the 1903 flood, and also on account of the very heavy railroad traffic across the bridge and the congested yards at both ends.

NEW SUBSTRUCTURE WORK.

The new abutments are buried piers 26 ft. x 54 ft., and 50 ft. 6 in. high, supported on 96 piles each. The footings are 7

While the abutments were under construction timber barges were framed on the shore and were equipped with hoisting engines, derricks and dredge buckets for clearing the site of the new piers. Many methods of passing the obstructions in the river bed were considered, including the use of pneumatic caissons and of steel sheet piling. It was realized at once that steel sheet piling could not be depended on to cut its way through such a tangled mass of steel and the cost of cutting through this steel in compressed air would have been exorbitant, especially as it was known that bridge pins, car axles and other very heavy steel parts would be encountered. It was, therefore,



Details of Falsework and Blocking at Pier During Side Movement of Spans.

ft. deep and project 7 ft. in front of the neat work. The shaft is 9 ft. wide at the top of footing. The backwalls are 6 ft. high and are extended 9 ft. beyond each end of the pier to prevent the ballast and back fill from running around onto the bridge seat.

During the excavation for the abutments the track was carried on temporary blocking until a sufficient depth had been reached to allow the insertion of 60 ft. deck plate girder spans. Open excavation was carried down about 14 ft. below the bottoms of the girders. Below that level the excavation was made in cofferdams.

decided to remove this material over the entire river bed by dredging through the water with orange peel and clam shell dredges before placing any cofferdams. Dredging at pier two continued night and day for six weeks, at pier four for three weeks, and at pier three for six weeks. The expense of the removal of this debris made the cost of excavation for the piers unusually high. This dredging was very tedious. At times the bucket would strike steel and come up empty, again it would take hold of a mass which it could not move, again it would be caught in the obstruction and require great care to free it. As a rule the free material was dredged as deep as

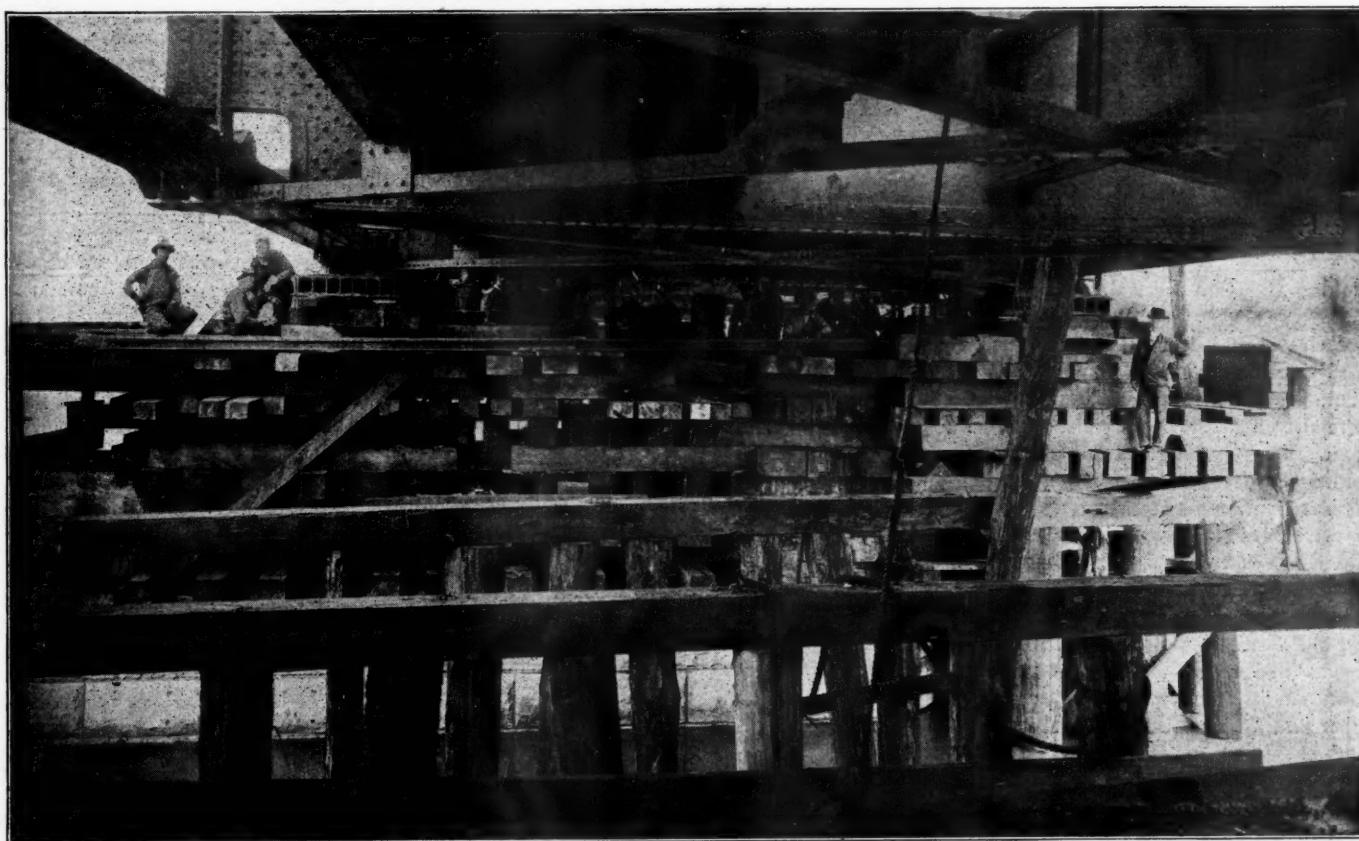
possible around the old bridge iron and when the dredge failed to bring up any more material a diver was sent down to dynamite the steel until the parts were sufficiently loosened to be removed. Much of this work was done in 30 ft. of water.

The footings of the new piers are 18 ft. wide and 54 ft. long, with 108 piles under each pier. The shafts of the piers are 12 ft. 6 in. wide at the top of footings and 9 ft. wide under the bridge seat coping course. While the dredging was in progress the pier cofferdams were built on shore. In order to avoid damage to the lower edge in case the cofferdams were to strike any steel still remaining in the bed of the river they were provided with steel cutting edges. As the previous dredging had extended so deep the sinking of the cofferdams was comparatively simple. On account of the porous soil under the bed of the river the cofferdams could not be pumped out and the piles were driven through the water. After the piles were all driven in a cofferdam a sand sucker was used to remove the accumulated sand and debris down to the proper level, after which a 5 ft. sealing course of concrete was placed around the heads of the piles by

as the flood was carrying large cakes of ice which were striking the forms violently. After the flood subsided, however, it was found that no damage had been done and the concrete proved to be as good as any in the bridge. On account of the late start which was made in the season of 1911, and the time consumed in clearing the river bed, all of the concrete was placed during the winter, most of it at temperatures below freezing. The three piers were practically completed March 16, 1912.

TRANSVERSE MOVEMENT OF SPAN.

The contract for removing the superstructure was let to the Jobson-Gifford Company, New York, and work was begun about the middle of January. It was decided to move the old bridge in the following order: First, raise the three old spans to the full height; second, move the old spans transversely to the new alinement; third, shift the spans longitudinally to their final position, and fourth, erect the new span. As the bridge had been raised $2\frac{1}{2}$ ft. in 1910, the remaining raise amounted to about $6\frac{1}{2}$ ft. It was decided that one end of a span 180 ft. long could be raised $\frac{1}{4}$ the total lift higher than the other end



Side View of Blocking on Pier During Raising of Bridge.

means of a tremie, consisting of a 10 in. pipe surmounted by a square trough. The bottom of the tremie was placed on the bottom of the excavation and the pipe filled with a concrete of a 1:2:3 proportion mixed very wet. The tremie was slowly moved from side to side of the cofferdam working from end to end between the rows of piling until the desired thickness of 5 ft. was placed. This sealing course was allowed to set six days, after which the cofferdams were pumped dry, the piles cut off 6 in. above the surface of the concrete and the remainder of the piers placed in the dry.

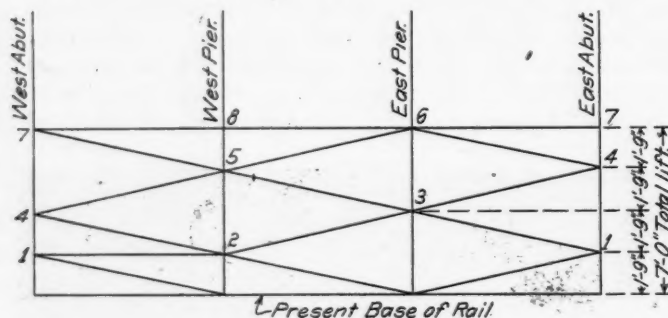
In placing the middle pier a flood came very nearly overtopping the cofferdam, and to prevent this, concrete was placed continuously day and night, the forms being built at the same time. By strenuous work the level of the concrete was maintained about 1 ft. above the level of the flood until the crest was reached. The concrete was raised 20 ft. in 24 hours, and some fear was felt as to the bursting of the forms, especially

without detriment to traffic, resulting in a grade of about 1 per cent. on the span.

The work of lifting was slow, but the work of removing the overhead bridges was slower and the jacking was very nearly delayed by their presence. As the bridge was raised the load was carried on 12 in. by 12 in. blocking which served three purposes: First, to carry the truss shoes in their former location; second, to carry the jacks for raising the span, and third, to carry the load in the new location that would be assumed by the truss shoes after the transverse movement. The intermediate spaces were filled with rough timber blocking to carry the trusses while the bridge was being rolled sideways. As the bridge had to be kept continuously in service it was impossible to jack for long periods, but arrangements were made to give the contractor about 40 minutes in the forenoon and about an equal time in the afternoon. During each of these periods it was usually possible to make a lift of about 1 ft.

When the spans had been raised $2\frac{1}{2}$ ft. in 1910 pedestals had been built up of I-beam grillages buried in concrete with their tops $4\frac{1}{2}$ ft. above the top of the main pier. The further raise of $6\frac{1}{2}$ ft. made the pile of timber blocking on the piers 10 to 11 ft. high for the support of the jacks and of the spans in their new positions.

Pile driving for the falsework was started before the completion of the jacking. As much of the falsework came under the old trusses and could only be driven from the bridge, it finally became necessary to take one track on the bridge out of service continuously. For the side movement at the west abutment which was only 2.7 ft. a frame bent was set on the upstream projection of the footing course and the blocking on the



Starting at abutments, raise base of rail to position "1". Then raise over west pier to "2" and similarly in succession to "8" when entire bridge will be at desired grade

Jacking Diagram for Raising Bridge Before Transverse Shift.

pier was extended out over it to form a support for the trusses in their new position. At the two river piers and the east abutment, posts were set on the footing projections and pile bents were driven at 3 ft. intervals, each bent having five piles 3 ft. apart. The blocking on the piers and east abutment was extended out over these bents to form pile pier extensions for the support of the up-stream trusses after their movement.

Just before starting the transverse movement the trusses were jacked up and the blocking immediately under the shoes was replaced by two nests of rails separated by rollers. The lower nest consisted of four rails spaced 7 in. apart covering the new and old locations of the truss shoe as well as the space between them. The upper nest consisted of four rails turned upside down, slightly longer than the width of the shoes. Between the upper and lower rails were placed a number of 2 in. rollers 4 ft. long made into nests by angle irons which served as spacers for the rollers. The length of each nest was equal to the width of shoe plus $\frac{1}{2}$ the distance through which the shoes were to move. The rollers were spaced 6 in. apart for the rolling. As it was necessary to put them in under some shoes several days in advance of the movement, the rollers directly under the shoes that carried the weight of the traffic were spaced 3 in. apart in order to avoid danger of the rails cutting into them and increasing the difficulty of rolling. After all the rollers had been placed a sudden rise in the river caused some anxiety as to the safety of the structure since the water level was considerably above the tops of the old piers and the spans could easily have been rolled off. Arrangements were made to load the bridge, but the rise was not great enough to require it.

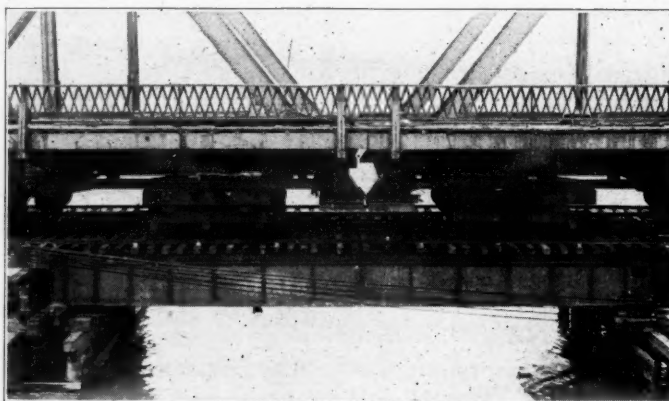
The transverse movement of the bridge was effected by hoisting engines, the falls consisting of seven part $\frac{7}{8}$ in. steel cables. These were anchored to a large cypress pile driven at the end of each pier. The lead lines were operated by a derrick car at each end of the bridge and by hoisting engines on flat cars over each pier. As the movement of the bridge was not the same at all of the supports it was necessary to calculate the direction of movement at each support so as to make the complete bridge move somewhat similar to the spoke of a wheel, the center of rotation being 60 ft. west of the west abutment. The angle of

inclination of the rails and rollers was so adjusted at each support that the movement of the rollers would take place along a chord to the curve through which the shoe was moved. It was feared that difficulty would be experienced in controlling this movement so that the proper amount of movement would be made over each support, but the hoisting engines controlled the bridge so well that at no time was it more than 2 or 3 in. out of line. The track was cut at 10:35 a. m., and connected up again in the new location at 1:15 p. m., an interruption to traffic of two hours and 40 min. The work of moving the span required only 50 min. of this time, and the actual rolling time was not more than 2 min.

During the raising and side movement of the bridge, falsework piles were being driven continually and practically all the piles were in place when the side movement was made. This falsework consisted of blocking on the ground at each end of the bridge landward of the old abutments and pile bents in the river. These bents were spaced 14 ft. apart and each bent was composed of eight piles driven to refusal and capped with a 12 in. x 12 in. timber. When these piles were cut off the water was within a few inches of the level of the cutoff and still rising. The caps had to be put in place in the water. As the water never fell below the caps until after the longitudinal movement was completed, it was impossible to properly brace the pile bents. The condition of the falsework in this respect was far from desirable, but the proximity of the spring flood made it necessary to go ahead with the work without the bracing.

LONGITUDINAL MOVEMENT.

The longitudinal movement of the bridge was made on especially built trucks after considering a number of other methods. The use of small rollers would have been very expensive on account of the large number of rollers and other apparatus that would have been required. Standard car trucks were not used as no satisfactory method could be worked out to avoid the overloading of individual trucks, the failure of any one of which would have been disastrous. The special trucks were built of heavy timber and standard car wheels, axles and journal boxes. These trucks were designed to operate on two standard gage tracks 15 ft. 6 in. center to center laid on the falsework at an



Trucks Carrying Bridge Over Deck Girder Falsework Span.

elevation of 11 ft. below the tracks on the bridge. Two trucks were placed under each corner of each span, making eight trucks of three pairs of wheels each supporting each 500 ton span, or a load per axle of 21 tons.

As the load on any axle under the best conditions would be high it was decided to use only axles and wheels that had been tested in service. The 72 pairs of wheels which were required were removed from 50 ton coal cars and made up into 24 trucks, the three pairs of axles being held in place by 12 x 12 in. timbers bolted to the tops of the journal boxes at each end of the axles. Other 12 in. x 12 in. pieces were laid crosswise on these timbers to distribute the load equally among the three axles. On top of these was placed the blocking for supporting

the bridge. The trucks were placed under the centers of the stringers in the end panels and the next to the end panels of the trusses, enough blocking being placed under the stringers to throw the load on the trucks. The distribution of the trucks made it practically impossible for any one truck to carry double the load for which it was designed, but it was thought that there might be an increase of 50 per cent. on an axle making a total load of about 30 tons. As the weight of a 50 ton coal car fully loaded is nearly 80 tons, the axles which were being used had all been in service under a static load of at least 20 tons, and as this load is increased from 50 to 100 per cent. by impact, no fears were felt as to the safety of these trucks for carrying the bridge, especially as that load would have no impact.

A few days before the bridge was ready to be moved longitudinally the trusses were jacked up and the rails and rollers which had been used for the side movement were removed and replaced by sand jacks. Each sand jack consisted of a box 10 in. high, the four sides, top and bottom being composed of 3 in. x 10 in. lumber held together by $\frac{3}{4}$ in. bolts. The floor of the box was larger than the frame and the frame was slightly larger than the truss shoe, the top of the box being composed of loose pieces fitting within the sides. Each box was filled level with sand and the cover placed on before the truss shoes were let down. These jacks carried traffic for several days while the preparations for moving were being made. When everything was in readiness the bolts holding together the sides of the sand jacks were taken out and the sand removed from under the shoes, letting the spans down gently onto the trucks which had been provided with blocking under the stringers. The application of the weight to the trucks and falsework caused a settlement of the spans of about 3 in.

As an anchorage for the longitudinal movement several heavy bridge timbers had been buried behind the east abutment and both ends of a 1 in. cable led from the deadman to the backwall of the abutment. Two sheaves were attached to the projecting ends of these cables, two other sheaves were attached to the floor beam at the first panel point from the east end and lines were run through these sheaves to form nine part $\frac{5}{8}$ in. steel cable on one side and four part $1\frac{1}{4}$ in. manila rope on the other side. The lead lines were run to drums on hoisting engines mounted on flat cars anchored to the bridge. The sheaves were attached to the east span only. It was thought that the rails would form sufficient connection between the spans to pull the middle and west spans, but as an additional precaution, 12 in. x $\frac{3}{8}$ in. plates were bolted to brackets projecting beyond the end floor beams of the spans over the piers making a continuous steel structure 540 ft. long.

While the sand jacks were being removed a derrick car removed the 125 ft. of temporary frame trestle at the east end and the bridge was ready to be moved. Simultaneous pull on all the lines was not sufficient to overcome the inertia of the bridge and the heavy pull broke the deadman cable. A new hitch was taken on it by digging down a short distance, jacks were placed against all the truss shoes and a locomotive set to push against a strut on the floor beam at the west end. Simultaneous application of all this power started the bridge and it rolled 123 ft. to the new pier in about three minutes. One difficulty arose during the movement of the spans which was caused by uneven cutoff of the falsework piles. The trucks, supporting one corner of a span before the movement started, rested on a high point in the falsework and during the movement rolled to a lower point causing the shoe at the end of the span to drop about $\frac{1}{2}$ in. below the top of the new concrete pier which it should have cleared by about 3 in. For this reason the movement of the bridge had to be stopped about 3 ft. short of its final location and the I-beam grillage on the bottom of the shoe removed.

After the spans reached the new piers, wedges were driven under the shoes to carry traffic temporarily and the weight was not otherwise removed from the trucks. Within the next few days, however, each of the spans was jacked over into final position and the weight removed from the trucks. It had been

intended to fill the gap at the west end of the bridge by setting frame bents and timber trestle on the falsework over which the bridge had rolled, but on account of the interference that would have resulted in changing this trestle for the new steel floor, arrangements were made to keep the bridge out of service until the new steel floor could be placed. The steel was previously loaded on a barge and raised to position by a derrick car.

The longitudinal movement consumed more time than was anticipated. The track was cut at 10:25 a. m.; the work of removing the falsework at the east end, letting down the sand jacks and moving the bridge endwise consumed about three hours; then the afternoon was taken up in placing the steel floor system for the new span at the west end so the track could not be connected up again until 8:15 p. m. The erection of the new span at the west end followed immediately and the falsework in the main channels was removed as quickly as possible to prevent damage from the spring flood.

After the bridge was moved off of the old piers this old masonry was removed. After taking off the piers to water level holes were drilled in the piers and they were broken up by dynamite, the broken stone being dredged by clam shell buckets. In the removal of the footing courses and the rip rap surrounding the piers a great deal of old bridge iron and other debris had to be removed. At one time five pin joints of an old Union Pacific truss with all truss members, floor beams and bracing attached were raised from the river bed and suspended from the Missouri Pacific bridge. A heavy pull by a 100 ton steam wrecker failed to loosen up the parts extending down into the river bed and they were finally shot off by dynamite placed by a diver. The work of removing all obstruction down to a specified level required about six months.

THE COLLEGE MAN AND THE RAILROADS.

By IVY L. LEE,

Executive Assistant, Pennsylvania Railroad.

I would direct your attention to the point brought out in a conversation I once had with W. M. Acworth, the distinguished English railway economist, who, after returning to London a few years ago, from attendance upon a meeting of the American Economic Association, made this observation:

I was surprised, hearing the college professors discuss the transportation question, to note how little they really knew of it. They understood the theory, but not the practice. And later, discussing the subject with railroad presidents, I was astonished at their lack of breadth. They understood the practice, but not the theory.

The demand of industry is for men who understand both the practice and the theory. Let me be concrete: It is the experience of the Pennsylvania Railroad that graduates who come to them from technical schools are deficient in three general particulars:

First, lack of practical experience and judgment;

Second, an idea that they are far superior to the rest of mankind;

Third, a certain narrowness of mind, inculcated through a too exclusive attention in college to mathematics and theoretical science, and a too great neglect of those broader subjects, such as political economy, history and general literature.

Here are a few suggestions as to how these deficiencies may be met.

The question of practical experience might be remedied by the man serving two or three years as a machinist prior to going to a technical institute. Of course, this is not feasible in a large number of cases, and the man must get his actual experience after he starts regularly to work. But the college can implant in his mind certain sound fundamental ideas. A man who has had a good engineering education and has absorbed com-

*Extracts from an address on "How Can the Colleges and the Railroads Co-operate?" delivered before the annual meeting of the Society for the Promotion of Engineering Education, at Minneapolis, Minn., June 26, 1913.

mercial ideas will make a good commercial engineer. One who is a theorist and scientific man only, with no commercial ideas, will make a good investigator, and possibly a good man in a test department, especially when engaged in scientific research; but even a good test department man requires some little idea of business, because test room questions are not settled on quality alone. The best quality for the same cost is the real question at issue. The man of great value to an industry is he who does not merely attempt to follow a theoretical ideal, but who adapts his theories to the actual limitations of the moment, and secures the best practicable result.

Men leaving technical institutions should be made to have a thorough understanding of the fact that they are necessarily almost completely lacking in a real knowledge of the practical application of the principles they have been studying. If a student can be trained by the time he completes his college course to have real openness of mind, he will be well on his way towards success when he leaves college. Young technical or educated men leaving school should, at the start, forget that they are men of scientific training, and tackle work precisely as do other workmen, knowing that when they have mastered that part of their education, the time spent in doing so will not have been wasted.

While it is not expected that technical men entering railroad shops shall have to consume as much time on menial or trivial work as those not possessing such advantages, nevertheless, to regard time spent in the shops as time lost in the pursuit of their true vocation is a very grave mistake, and results in many technical men not being advanced to a position of managing other men.

It is of the greatest importance, too, that students be impressed with the human elements in all industrial work; that is, they must realize that whatever their college education may have been, they are of very little real value until they have acquired something which few colleges teach. Too often young men come from our colleges with the feeling that they know too much to be told anything by men who have not had a college education. By assuming such a stand they close the mouths of men who could and would give them very useful information.

A beginner in the practical end of any line of work should be taught beforehand that college education is not everything, and that results can only be accomplished through other men. Therefore, he must get the viewpoint of other men before he can secure that sympathy from these other men on which his success as a manager will depend. In doing this, he will get much misinformation, which he will know to be such, but this knowledge he should keep to himself. We see all around us men holding the highest positions, who have come up from very small beginnings, with no apparent advantages. Yet we find that these men have the business at their finger tips, because they have been through all of the grades. The feeling that the possession of an education relieves a man from the necessity of going into these details has resulted in many men becoming nothing but technical advisers to carry out the wishes of other men who thoroughly understand the details of the work. Such merely technical advisers never share in the great rewards which come to the men who combine a mastery of both theory and practice.

It is of prime necessity, of course, that a man who is trained to practice engineering shall have a good engineering education. Successful men in railway engineering work must necessarily be familiar with the laws of nature, and the fundamentals of mathematics. This information can be obtained, however, outside of technical colleges, and the man who obtains his information in this manner, by the necessarily more concentrated application on his part, is generally a better engineer than a large per cent. of college graduates. Many competent judges believe that technical courses in the majority of the colleges lay too much stress on details. If more time were spent on the study of fundamental principles, it would result in developing more resourceful men. Some of our officers, in advising young men, have suggested to them that they devote their entire time to the study of mathematics,

physics, chemistry and English, and one foreign language, and not take up any particular branch of engineering. A student who is well grounded in these studies can take care of any proposition which will come before him. His resourcefulness will be developed by reason of his being compelled to work from principles rather than trying to fit the problem before him to some particular detailed case which he has learned in his engineering course.

Many of our officers hold the view that the best shop work for college men is that which can be obtained during the summer in the various shops where actual work is done, rather than having the time of the student taken up by the more or less imitation shop work that is done at some of the schools. The most valuable part of shop experience to a student is the coming in contact with men and absorbing their experience.

I asked not long ago the man who, I believe, is conceded to be the greatest expert in this country in railway electrification, to tell me what he really learned in college. His reply was,

I am inclined to think that the most valuable asset that I brought out of my college course was the habit of studious application to the job in hand, rather than a finished knowledge of any subject.

In the final analysis, gentlemen, the technical student has only time to acquire a fairly good grounding in principles of engineering. The college trained man, however, has an immense advantage after he obtains some experience over the non-technical man in being able quickly to grasp the relation between the theory and practice and to apply correct principles to practice.

Young men are frequently placed in positions for which they are entirely unsuited, while if they were moved to other positions more adapted to their make-up, they would often prove successful. Some of the very best men we have in our shops at Altoona in certain departments can never go higher because there is nothing for them to do in general railroad work that is suitable for them. In some of these cases, no other men on the road could fill their present positions as well as they do. The only thing for such a man to do is to leave the railroad and seek a position with a concern that can afford to pay more for the particular kind of ability possessed by him.

This is a day of social service. Never before were so many men being called for to act for the people at large in the control of industry, and particularly transportation. The Interstate Commerce Commission has just advertised for a large number of engineers to assist in the pending federal valuation of railroads. Never did a situation more strikingly illustrate the need for men with practical training. If the proposed valuation is carefully and wisely made, it will do great good. As Thomas F. Woodlock said, in a most illuminating article in the *New York Times Annalist* of June 23, "Practical confiscation—partial at least—of property actually invested in railroads will be quite possible by 'valuation' if the public is determined to do it, or if the 'valuers' are permitted to run riot among the technicalities." It is an occasion when practical men are needed, men capable of seeing facts as they are—and not with reference to any theories or past prejudices.

So men are being demanded for work with public service commissions, in colleges as teachers, in university settlement and municipal health work, in city governments, and in all those capacities where men can serve their fellow creatures. This is one of the hopeful signs of our times. But this is a period of great unrest. Many strange economic and political theories are being preached. It is a time when our young men should see that things cannot be always as they should be, but that our duty is to make them as good as we can.

Railroad managers for instance, would be delighted to equip every mile of road with automatic block signals, to make every car of all-steel, to remove all grade crossings, and otherwise avail themselves of every device to insure safety. But this cannot be done without the necessary money. So in all things, it is well to hitch our wagon to a star, but be sure that the connecting rope is long enough and elastic enough to let us keep the wheels on terra firma.

B. L. WINCHELL.

B. L. Winchell has resigned as one of the receivers of the St. Louis & San Francisco to become director of traffic of the Union Pacific system. The change will become effective on July 14. Mr. Winchell's headquarters will be in Chicago, and he will report directly to Judge R. S. Lovett, chairman of the executive committee. The traffic local to the different lines composing the Union Pacific system will be in charge of the immediate officers of the respective lines. The director of traffic will have charge of traffic interchanged by the lines composing the Union Pacific system with other lines.

The readjustment in the traffic relations between the Union Pacific system and other railways that the dissolution of the Harriman system will cause makes the position of director of traffic of the former one of very great importance. The readjustment will stimulate competition between the various transcontinental lines, and it is with the aim of better enabling the Union Pacific to deal with this increased competition that Mr. Winchell has been made director of traffic.

While in more recent years Mr. Winchell has served the Rock Island and the Frisco as an operating and an executive officer, he is by no means a stranger to the traffic field. He began his railway career in the traffic department and was a traffic man until he became president and general manager of the Kansas City, Ft. Scott & Memphis in 1900. A sketch of Mr. Winchell, in which his many attractive and effective qualities both personally and as a railway officer were mentioned, was published in the *Railway Age Gazette* of December 10, 1909, page 1137. One of his most pronounced characteristics always has been his diplomacy and skill in dealing with connecting lines and with the public. Because of these characteristics he will be a very important addition to the official personnel of the Union Pacific. The Union Pacific system is universally recognized as one of the most efficient transportation machines in the country. It has had for years, and has now, a very strong organization which has been, and is, getting excellent results. Mr. Winchell will add to it an element which it has not possessed in the highest degree, and that is the ability not only to serve the public well, but also to make the system and its service as popular as they deserve to be.

While Mr. Winchell's jurisdiction will extend over the entire Union Pacific system, he will have no official title on the San Pedro, Los Angeles & Salt Lake because the Union Pacific owns only a half interest in this road. He will, however, act in an advisory capacity regarding traffic matters to the officers of the Salt Lake Route, which will become under the new conditions a more important factor in transcontinental business than it has been heretofore.

Mr. Winchell began railway work in July, 1874, as a clerk in the office of the superintendent of machinery of the Hannibal & St. Joseph. He was subsequently clerk in the auditor's

office of that road, chief clerk in the general freight and ticket office of the Atchison & Nebraska and assistant general passenger agent of the latter road until April, 1880, when he was made chief clerk in the general passenger department of the Kansas City, Ft. Scott & Gulf and the Kansas City, Lawrence & Southern Kansas. Three months later he was advanced to assistant general passenger and ticket agent of those roads, and from June, 1882, to May, 1895, he was assistant general passenger and ticket agent of the Kansas City, Ft. Scott & Memphis and the Kansas City, Memphis & Birmingham. He was then for three years general passenger and ticket agent of the Union Pacific, Denver & Gulf and the Denver, Leadville & Gunnison. On May 1, 1898, Mr. Winchell went to the St. Louis & San Francisco as general passenger agent, resigning in December of that year to become vice-president of the Colorado & Southern. He returned to the Kansas City, Ft. Scott & Memphis system in October, 1900, as president and general manager, and in August, 1902, he was made vice-president and general manager of the St. Louis & San Francisco system. In October of the following year he was chosen first vice-president of the St. Louis & San Francisco system, third vice-president of the Chicago, Rock Island & Pacific, and vice-president of the Chicago & Eastern Illinois and Evansville & Terre Haute. He was elected president of the Chicago, Rock Island & Pacific in April, 1904, and on December 1, 1909, was made president of the St. Louis & San Francisco lines and the Chicago & Eastern Illinois, which position he held until his recent appointment as one of the receivers of the St. Louis & San Francisco.

**B. L. Winchell.**

THE CHINESE AND RAILWAY DEVELOPMENT.—The Tientsin-Pukow Railway was originally designed to connect with Chinkiang, but the Northern Kiangsu merchants did not realize what huge benefits a railway would give them, so, when it was ultimately decided that instead of running to Chinkiang the line was to go to Pukow, there was very little opposition from the Northern Kiangsu people.

But now the rising prosperity of the districts where that Tientsin-Pukow line passes has demonstrated to them clearly the enormous value of railways. They have become aware of the fact that Nanking is getting a great volume of traffic which would have been theirs, and they are deploring their short-sightedness. The desire to make up their loss explains their enthusiasm at present in discussing railway schemes. It is reported that recently the Chinkiang and Yangchow merchants had a discussion about railway projects and are determined to have a railway of their own. Their plan was to build a line from Liuhaockow, opposite Chinkiang, to Siennumiao, the famous rice market. The promoters of this new railway line are reported to have raised enough funds to carry out this project, and it is expected that construction work on the line will soon be started. This short railway will be ultimately extended to Shaopo, to effect a junction with the Tsingkiang-pu-Tungchow Railway.

GEORGIA GOVERNOR DENOUNCES LABOR UNIONS.

A severe denunciation of labor union tactics with special reference to the actions of strikers in a recent strike of employees of a Georgia railroad characterized the farewell message of Governor Joseph M. Brown of Georgia, delivered before the new legislature on June 25. Governor Brown declared that even in their gentler aspects the unions take the nature of a gigantic labor trust out of all accord with the modern movement toward the suppression of combinations and are a menace to all classes.

"It is a matter of public note," he said, "that the labor trust is the most widespread and aggressively exacting trust in America; politicians pander to it, statesmen stand in awe of it and the public seems helpless in its grasp. Why? Because it votes in blocks of thousands in almost every state in the Union. It is composed of allied organizations which stand against all others."

Discussing the Augusta riots in connection with the strike, he said that so long as the railroad attempted to carry out its obligations as a common carrier it was the duty of the state to resort to extreme measures to protect it in serving the public; that the strikers themselves were in open rebellion against the laws of Georgia, and ignored the cardinal principles of republican government when they attempted to throttle the railroad and inconvenience the public. "Compulsory arbitration should be required, and neither the management nor the employees of a public service corporation should be permitted to paralyze the powers of the public. As to the killing in Augusta of three men, who by their deeds defied the militia, the suppression of anarchy is the right and duty of all, and there come times when they must shoot it to death just as they shoot down foreign invaders."

The acts of the strikers in leaving the service and in virtually encouraging the formation of mobs to intimidate and personally assault those citizens in the common carriers that they induced to take the places they had vacated, represented logically, he said, a claim which can be expressed in these words: "This is your property, but it is my job on it. I and my partner, the Union, will defend our mutual rights to exclusive ownership of the position which we hold on your property. We will determine for you whom you shall hire and whom you shall not hire and what wages you shall pay. While it is true that we haven't invested a dollar in this public service utility and you have invested millions in it, yet we have vested rights in these positions, rights we have accrued by usurpation, and we will hold them while defying the laws of the state and subjecting the public to serious inconveniences and loss, even against you. On your property, chartered to serve the public, we are supreme over you, supreme over the public. Supreme over the law, the union label carries more authority than does your great seal of state."

He quoted statistics from the report of the Railroad Commission of Georgia, showing that under the wage scales of 1912 the number of railway employees in 1908 would have been paid \$3,668,725 more than they received in 1908, an average increase for each railroad employee in Georgia of more than \$105 per annum. "The individual wage scale further shows," he said, "that by far the largest increase in wages has been paid to employees belonging to labor unions; such as engineers, firemen, conductors, train hands, etc., and that while the average increase to each employee was \$105 per annum, the average increase to each member of a labor union, in some instances, doubtless approximated \$300 or more."

"Tens of thousands of other citizens who are not in these unions, therefore, are confronted by the fact that the unions are levying a tax upon them to the extent that they are forcing from the employer an inequitable proportion of the wages paid to the general classes in the state."

"If the state not only authorizes unions to exact a higher wage than others are receiving, but also permits them by authority of law or by winking at their violations of it to hold up the public and rob it of the facilities of transportation, then it cannot claim the right to protect any farmer or any other person employing labor against the employees who might strike, and proclaim to him that no one else shall work his crop for him. If the state says to owners of railroads, factories, etc., 'you shall pay tax on this property, which you have created or bought, but neither class shall control it, I hold you responsible for keeping it in condition for safely serving the public, but allow them the privilege of wrecking it, or of depriving the public of the use of it,' then how can she protect a farmer or any other citizen in the right to control his property?"

The governor stated it was not his aim to brand every member of labor unions as violators of the law. There were many law-abiding men, but they were all victims of a system which is breeding anarchy. He charged the system with "applying lynch law to billions of dollars' worth of property."

He urged upon the legislature the necessity of a law for compulsory arbitration, and suggested an amendment to the state code to require the sheriff of a county to notify the railroad commission of any act to attempt the stoppage of performance of duties for which a public service corporation was chartered, and to authorize the governor to issue a proclamation authorizing the sheriff to give protection; if necessary, by the aid of military authorities.

SYSTEM AND ORGANIZATION IN STATION WORK.*

At the small station, the agent lays the foundation for his future success. To a large extent he is left to his own resources with certain rules and instructions as a guide to the general work. His duties are many and varied and in order to successfully perform them, it is quite necessary that he map out a system adapted to his particular station. The most essential part of a system is to have a place for everything, and everything in its place, conveniently arranged for easy access without unnecessary steps.

The brief outline which we will describe would apply not only to the non-competitive station, but to the competitive station as well.

The work of the day should be commenced by arriving at the station at a certain and reasonable hour, not only one morning, but every morning. If there is an early train, the agent should reach the station in ample time to have everything in readiness for its arrival, whether it be the passenger or the way freight. The patrons and the agent's fellow employees will soon appreciate his regularity and promptness and will in many ways materially assist him in establishing a reputation for a system that assures promptness and despatch in every part of his organization. The agent upon whom rests the responsibility must not be unmindful that quality of service is more essential than volume in everyday accomplishment, and every inference here is intended to imply that meaning, and despatch and volume is second always to quality of service.

In the detail work of the office, such as the expensing and abstracting of way-bills, both in and outbound, the making up of the daily ticket sales and the remittances, etc., he should know on an average about how much time is required for the different work each day and set aside a certain hour for it, including errands uptown; in other words, know today just what time of the day he should have the various kinds of work done and out of the way tomorrow. He should train himself to work by schedule—circumstances may not permit him to follow it day in and day out, but the average will be

*From the Monthly Bulletin of the Traffic Department, Chicago & North Western Railway.

in his favor. If the regular duties are taken care of, the irregular ones will be provided for by an extra time allotment. At the close of the week, a trial balance covering the cash transactions for the week should be made; even if it does add an extra hour to the daily schedule, the time will be well spent and noticeable at the end of the month. An extra hour or two of the last day should be spent in closing the ticket register for the month and copying the commencing numbers for the new month, list the uncollected freight bills to accompany the monthly balance sheet; totalling the Western Union, which has been entered up from day to day, also the cash book; making a trial balance of the entire month's business, after which the final remittance should be made. Another very important feature at each and every station, no matter how small, is the prompt reply to correspondence. Agents should make every effort to answer letters promptly, as delay in doing so often creates extra and unnecessary labor in various departments, such as tracing for lost freight or reports, etc.

Passing from the smaller to the larger station, practically the same system should be followed, but it is here that organization enters more fully into the work at the station, on account of two or more employees being required. Each individual clerk's ability and capacity should be studied and the work apportioned accordingly and the clerk held responsible for the work assigned to him. More than one person trying to do the same work will soon destroy the system as well as the organization, and will shift the responsibility and seriously affect the reputation of the agent, not for the amount of work he can do himself, and not for the amount of work he can secure from a fellow employee, but because he is at the head of an organization and as such will prove that he is unable to so properly conduct his business as to entitle him to consideration for higher service.

The foregoing all relates to clerical procedure, system and organization of office work, and at the close of the month the agent has an opportunity to survey the general situation through comparisons secured by abstract work and comparative reports, which he is usually obliged to make. We refer particularly to Form 110 in which he combines and compares each separate result for the month past, and equips himself with information necessary to answer all questions, as well as furnishing his superior officers with information. This gives him a line on which to base his future work, as this report develops any and all weaknesses and affords him the opportunity of concentrating his efforts on the weak points in solicitation, so that he may overcome a disability which may have been in effect for several preceding months, unless known and unless action has been taken by the agent to turn the tide.

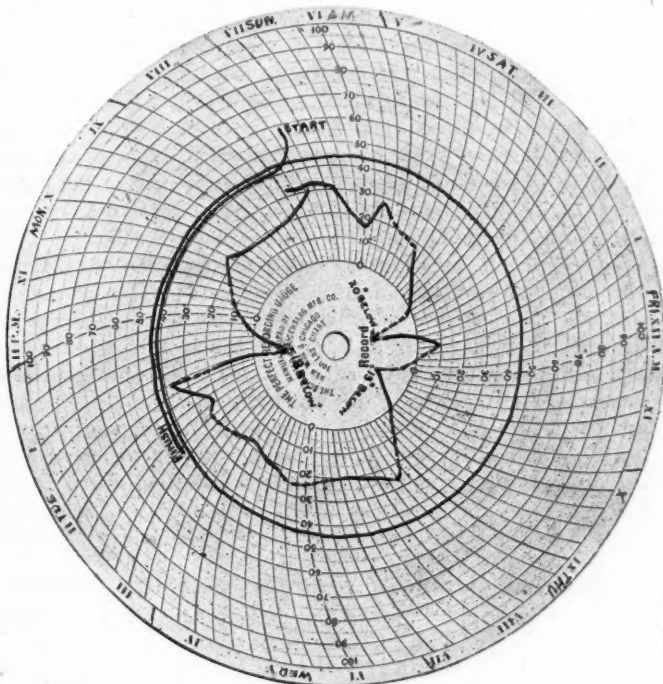
A few hours of careful study of comparative results at the close of the month qualifies the agent for the future month's procedure, and if the above plan is carried out by the agent and the necessary outline of future action noted, it will bring him up to the manner of most successful solicitation. It is our opinion that this can be greatly aided by experience, care and perseverance, although the natural element that is a part of a soliciting element is perhaps more pronounced in this particular department than in any other part of the agent's duties.

VICTORIAN RAILWAY IMPROVEMENTS.—Traffic expansion on the Victoria Railways, together with the introduction of heavier types of rolling stock, has necessitated not only the entire substitution of heavier permanent way materials, but the renewal and strengthening of bridges. The manufacture of girders and bridge members in the state is unavoidably slow, and as this retards rapid strengthening of the structures before the train services can be improved, it is possible that if manufacturers were to make some proposition estimated on a wholesale basis, the commissioners would be well advised to accept, as the work would be completed quickly and not dragged out over a number of years.

TESTS OF ALCOHOL HEATER CAR.

In shipping perishable products during the winter months, some precaution must necessarily be taken to prevent their freezing, and the practice very commonly followed is to line box cars with building paper and equip them with false floor racks and small stoves. The objections urged against this practice are the initial cost for equipping the cars, which are not always returned for repeat loads, and the cost of attendance along the road, as well as the risk from damage by fire. Specially fitted heater cars are in use to some extent for such traffic, but the objection which is commonly raised against this type of car is that it is necessarily non-revenue producing for about nine months of the year, unless used as an ordinary box car during that time, and the heater car necessarily costs more than the ordinary box car.

A solution of the problem would seem to be a combination heater and refrigerator car that would be available for use the year round. There are several types of this car in existence, one of which has been developed by the Alcohol Heating & Lighting Company, Chicago, and was described in the



Record of Temperature Test of Alcohol Heater Car.

Railway Age Gazette, June 7, 1912, page 1244. After making tests with a number of fuels, it was concluded that denatured alcohol was the best adapted to the purpose in hand, as it does not vitiate the air to the same extent as other fuels, and it can be used as a heating agent without any detrimental effects on food products. Considerable time was spent in developing an automatic alcohol burner, and one was finally produced that could be safely operated for from eight to fifteen days without any attention other than an inspection made at divisional points.

These cars have now been in service during three winters, and the illustrations accompanying this article show the result of a temperature test made on one of them in use on the Canadian Pacific. The recording thermometer was placed in the car at 11 a. m., March 2, at which time the doors were closed and sealed, the car remaining in this condition until 8:30 p. m. March 11. The full line on the diagram represents the temperature inside the car, and it will be noted that it was maintained almost constantly between 40 and 45 deg., a variation of less than 5 deg., while the temperature outside varied 58 deg., as shown by the dotted line on the diagram. During this time the car traveled a distance of 1,475 miles.

The test was conducted under the direction of A. W.

Whiting, inspector of refrigeration of the Canadian Pacific, and was run between West St. John, N. B., and Fort William, Ont. The car was equipped with what is termed the double unit system, there being four burners, two on each side of the car. These burners are exactly the same, but for convenience in conducting the test were numbered one and two. By using four burners the maximum amount of heat can be applied quickly at the point of loading, and when the car and contents have been thoroughly warmed two of the burners are extinguished, the two remaining ones being sufficient to protect the lading. The duplicate system insures a longer run without the necessity of cleaning the burners; each burner will burn continuously for seven days without cleaning, and if the car is reconsigned it is only necessary to extinguish one burner and light the other.

The car was loaded with boxed merchandise to a height of about 4 ft., there being no space between the boxes or at the doors. Both the number one burners were lighted at 11 a. m., March 2, 1913, and a self-recording thermometer was placed inside of the car, 6 ft. back from the door, 2 ft. above the floor and 2 ft. from the side wall. The thermometer was surrounded entirely by freight in order to determine the temperature of the freight rather than the temperature of the air inside the car. The car left West St. John at 8:45 p. m. March 3, with the two number one burners in use; the number two burners were lighted at 8:45 p. m., March 4, at Megantic. The burners were inspected at each division terminal and were found to be operating satisfactorily in every case. The reservoirs were refilled once during the test, each box being supplied with $7\frac{1}{2}$ gal. of alcohol at Smiths Falls, Ont., at 10:30 p. m., March 6, at which time the two number one burners were extinguished and the car continued to its destination with the two number two burners operating. The fuel reservoir can be made of any desired size, but it has been found in practice that four days' supply is the most economical and satisfactory on account of the character of the train schedules and the length of time that the perishable freight must be protected. On account of the location of the thermometer it is not probable that it could have been greatly influenced by the

warm air entering the car at either end, but instead received only the benefit of the warm air rising from the floor of the car. High winds and snowstorms prevailed at several points during the trip. The car arrived at Fort William, Ont., at 8:30 p. m., March 11, and the thermometer was then removed and the test closed. The burners were operated a total of nine days, ten hours, the actual running time of the test being eight days.

A CITY THAT APPRECIATES A RAILROAD.

Montclair, N. J., a city of about 25,000 inhabitants, enjoys the distinction of being at the end of a railroad, although it is only 15 miles from New York; and so it has a terminal station. The beautiful new station of the Delaware, Lackawanna & Western in that city was described in our last issue, page 9.

On the day of the opening of the station there was a large public meeting, attended by citizens and by officers of the railroad, and there was delivered to President W. H. Truesdale the following:

AN APPRECIATION.

The Town of Montclair to the President of the Delaware, Lackawanna & Western Railroad Company and his Associate Officials.

"The citizens of Montclair feeling a just pride and gratification in the completion of a notable civic improvement, desire to express to the president of the Delaware, Lackawanna & Western Railroad Company and his associate officials their appreciation of the generous spirit which has provided for the town a worthy approach and gateway, and to commend the manner in which the officials of the company have co-operated with the officials of the town in overcoming numerous difficulties and in providing a splendid public utility.

"Friendly co-operation for the general welfare has both constructive and instructive value. Of this fact the Lackawanna terminal is an enduring object lesson to the community. Its architectural beauty and commodious proportions, while showing the characteristic public spirit of the builders, also typify the stability and prospective growth of the community.

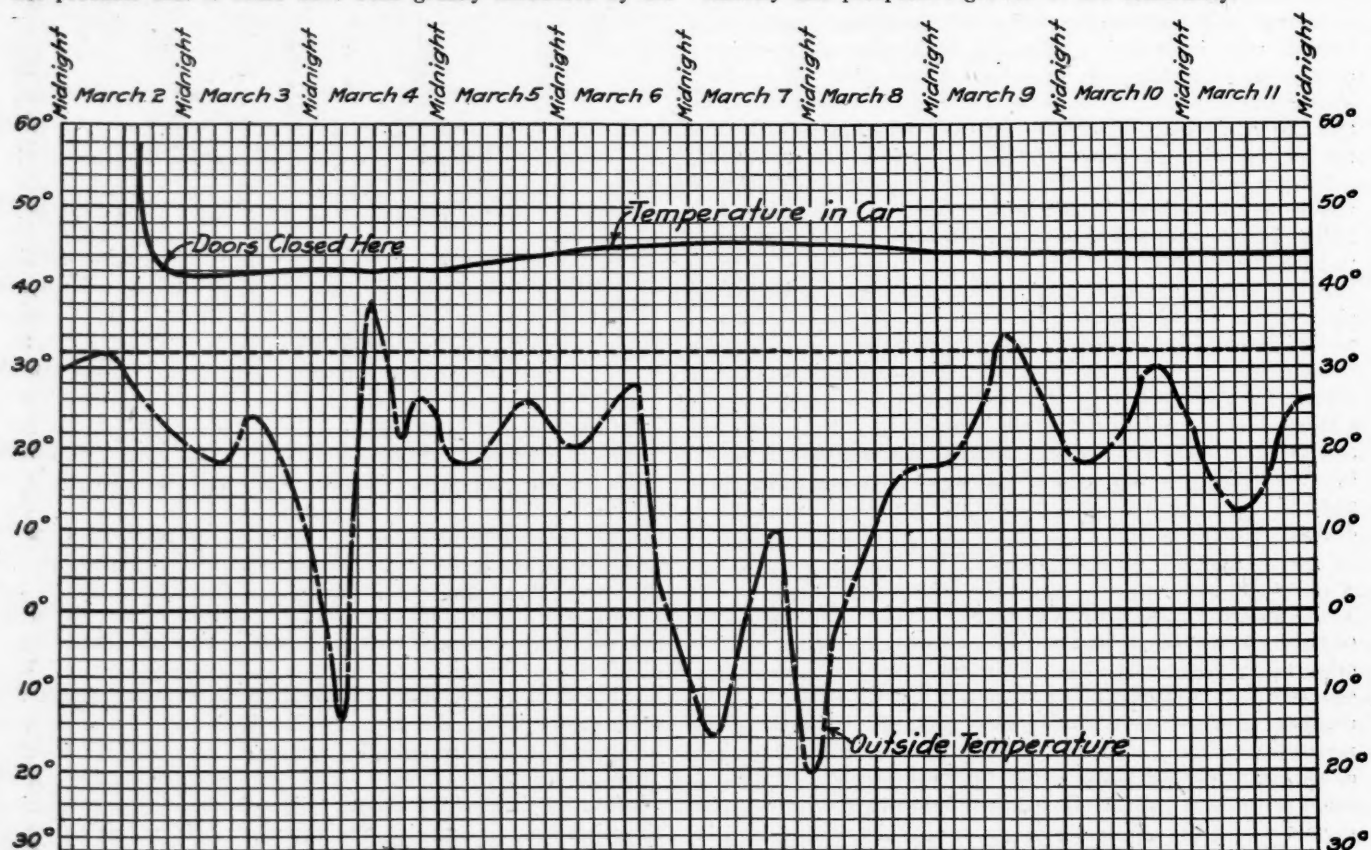


Diagram Made from Record of Recording Thermometer in Alcohol Heater Car Test.

"Therefore, the citizens of Montclair, acting through a general committee appointed pursuant to an unanimous vote of the town council, present this testimonial of their good will and grateful acknowledgment to William H. Truesdale and his associate officials."

This was signed by Mayor E. C. Hinck. As an introduction to it there was an address by J. Starr Murphy, a prominent New York lawyer and philanthropist, a resident of Montclair, from which we quote as follows:

"The beautiful and commodious terminal whose opening we celebrate today is an illustration of the principle of co-operation between the municipality and the public service corporation which serves it. . . . In 1854 our town was known as West Bloomfield. There were no means of communication with the city except by a stage coach running to Newark, and thence by rail over the Morris & Essex Railroad. Enterprising citizens procured from the legislature a charter incorporating the Newark & Bloomfield Railroad Company. They found it difficult to raise money and the New Jersey Railroad & Transportation Company, which had secured certain rights, was consulted. Its engineers estimated the cost of the road at from \$175,000 to \$225,000, and they suggested that if the promoters of the road would raise \$75,000 and the new company would issue its bonds for \$150,000, the New Jersey company would guarantee these bonds and thus the road would be built. While these negotiations were pending the Morris & Essex road came forward, submitting an estimate by its engineers that the road could be built for \$105,000 and offered to take \$55,000 of the stock if the citizens would raise the remaining \$50,000. This they promptly did, and in June, 1856, just fifty-seven years ago this month, the first train was run from West Bloomfield over the new road (now a branch of the D. L. & W.).

"It is worth while to recall in these days of widespread criticism of railroads and similar corporations that, in this connection, the Morris & Essex rendered three conspicuous services to our community: First, they made possible by their co-operation the building of the road; second, they assumed the major part of the financial burden; and third, so far from injecting a huge amount of water into the system, they reduced the cost by over 50 per cent. of the estimates which had been submitted by the other corporation. Moreover, the engineers proved their capacity; for the \$105,000 which was raised not only graded and built the road, but left a surplus sufficient to purchase a locomotive, which was named the 'Bloomfield.' The equipment of the road consisted of one locomotive, two passenger cars, and one baggage car, which was ample for the traffic; and it is recorded that the same person sold the tickets at West Bloomfield (now Montclair) and then acted as brakeman on the train.

" . . . As citizens and tax payers we feel an added self-respect in realizing that our municipality, and through the municipality we citizens are bearing a share in the expense. While the legal title to the property is in the railroad corporation the building of it has added to the value of every piece of real estate in the town. . . . It is an unspeakable relief to us to know that the grade crossings in the town on this line of road have been eliminated; and on behalf of the citizens I want to thank our mayor and our council that they have had sufficient wisdom and courage to recognize frankly that these improvements were for the benefit of the municipality as well as the railroad, and to approach the negotiations in a manly spirit of fair dealing. And money has been liberally expended to produce not only a convenient and substantial structure but beautiful surroundings. The company seems to have appreciated the opportunities for beautiful treatment which the natural conditions make possible, and to have co-operated with the authorities who are making a beautiful park out of the glen between here and Glen Ridge. We have also noted the high fences which have been built to shut off some of the unsightly buildings which adjoin the railroad track. In front of these fences have been planted shrubs which will make the entire approach to our town a thing of beauty."

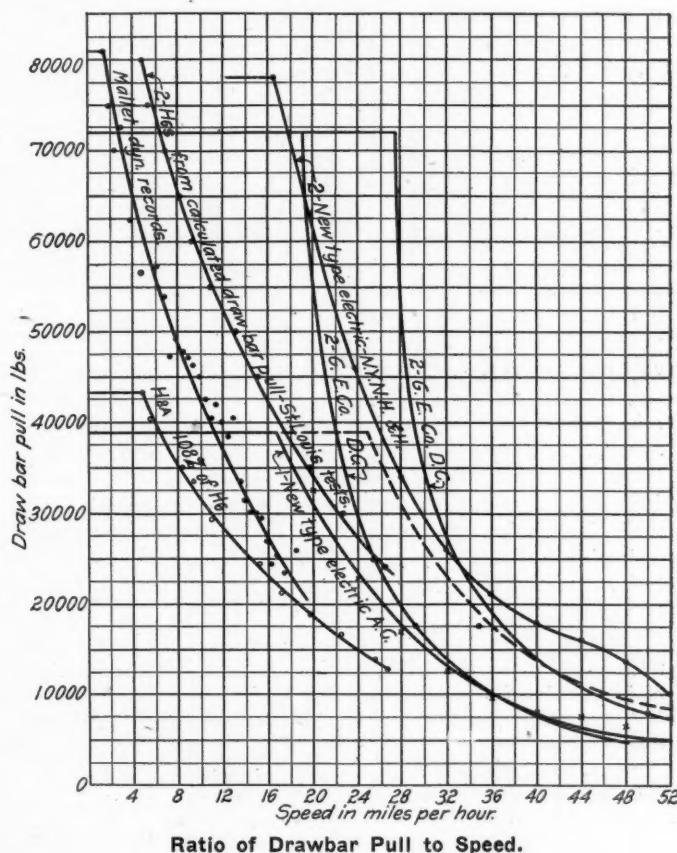
THE MINIMUM EFFICIENT GRADIENT.

BY PAUL M. LA BACH,

Assistant Engineer, Chicago, Rock Island & Pacific, Chicago.

The question as to what the economical limit for grade reduction is has been frequently asked and frequently answered in specific cases. At first glance it would seem to be a question which could be answered in general terms for all cases. But in my estimation this idea is a mistaken one, for an analysis will show so many independent variables that in the end there will be more unknown quantities than equations. The efficiency of a given gradient is the same as the efficiency of any other mechanism. It cannot be calculated without knowing both the input and output. While furnishing a part of this information the gradient does not give all the information required.

It is difficult to explain this in a limited space, as it takes into consideration practically all the operating characteristics of a railroad from an engineering point of view. Whether one gradient is better than another depends upon the cost per ton-mile-hour of each case under ordinary operating conditions.



The principal variables in the cost of operating trains are fuel and trainmen's wages. They do not necessarily vary according to the same laws, although the general trend may be in the same direction.

Usually this subject is treated as a problem in mechanics without reference to distance or time. When this gives different results from those found in practice, somebody comes forward and says that it is the difference to be expected between theory and practice. The fault is in the so-called theory. It is interesting to know that train resistance is 13 lbs. per ton or thereabouts, in starting, and that it decreases to 5 or 8 lbs. when the speed increases; depending upon the gross weight per axle. Demonstrations of grade resistance were made in the time of Euclid, so we cannot expect anything new on that subject. Twenty lbs. per ton for a 1.0 per cent. grade is about the only constant we have, as the other elements have been found by tests which provide a great variety of results. They vary with the

condition of the roadbed, weather and other external influences. The figures derived from these experiments must be applied with knowledge and understanding. Ability to tell whether or not we have parallel cases depends largely upon experience in such matters, and considerable knowledge of applied mechanics.

To make a rough approximation, we must have, in addition to the gradient, the number of tracks, a profile of the engine district and the kind of motive power to be used.

If we have a single track road with say 1.0 per cent. grades which we wish to reduce to 0.3 per cent., what will happen? If we do not lower the summits we will gain very little advantage, insofar as fuel consumption is concerned, except that due to a more uniform velocity. The average speed will be slower as the locomotive will not start as rapidly and will not reach a high speed on level grades with the new rating. The time in making sidings will increase. If the locomotive is loaded with all it will start, it will not reach the terminus in the ten-hour 100-mile time limit or even in 16 hours on a single track. If, for the sake of illustration, we say that the fuel account per ton remains the same, it is apparent that the trainmen's wages will increase, the amount depending upon the running time plus the time in sidings, etc., which latter amount is again dependent upon the congestion of traffic or the number of tracks. The tonnage behind the engine will have to be reduced more for a single track line than for one with two tracks. The single track may get enough benefit to make the grade reduction pay, but it does not follow that the relative proportion of profit will be the same for different numbers of tracks. Because a four track road derives a profit from a reduction in grade it does not follow that the same thing will pay on a single track line. As a general rule, it may be stated that to get the full benefit of very flat grades the number of tracks should be increased at the same time.

When summits are lowered, the fuel bill will be reduced depending in amount largely upon the speed of approach. Each case must be worked out with reference to its particular location, and for that reason it will not be discussed here. The general rule may be stated that the amount of fuel will decrease as the speed of approach increases. If the speed on the grade is decreased, one may derive little profit, although considerable difference in elevation may have been made. On multiple tracks, the sidings are usually further apart and a greater speed can be maintained. For this reason the benefits to be derived on one line might not be a fair criterion on another with a different system of operating.

Lengths of engine districts are generally fixed by other elements than economy. Competition, location of towns, topography suitable for yards, etc., all enter into consideration. Having once been fixed, they can seldom be changed. If the projected improvement only affects one district the problem may be different than if several districts are involved. Trainmen are paid on a basis of 100 miles. If the district is shorter than this, it will pay to give the locomotive a load that will take ten hours to haul between terminals provided it is not greater than it can start at all its usual stopping places. If a district is 120 miles in length, it may be run in twelve hours and must be in less than sixteen. With the shorter district it may pay to reduce the grade to make the grade resistance equal to the starting resistance. However, it does not follow that the same operation would pay equally well in the second case. As a general rule, short engine districts offer a greater opportunity for the development of low gradients than long ones.

Another feature to be taken into consideration is the locomotive to be used. The ability of the locomotive to get its train over the road on time is dependent upon its boiler capacity and not upon its tractive power in starting, as illustrated in the accompanying curves. The tractive power of a locomotive at starting is usually calculated from the formula $0.8 P d^2 s$ where

s = Stroke in inches.

D = Diameter of driving wheels in inches.

Inspection shows that the tractive power increases as the diameter of the wheels decreases. This is true at starting, but as the speed increases, the limit of full cut-off will be reached at a lower speed with the smaller driver. In the illustration this is the point where the power line changes from a straight line to a curve. Engine H 8 A is a consolidation type locomotive and full cut off can be maintained by its boiler at about 5 m. p. h. above which the drawbar pull falls off rapidly. The Mallet shown can start nearly twice as much as the consolidation, but has only about the same power at 20 m. p. h. If one must make an average speed on a district of 20 m. p. h., the question of how much the Mallet can start on a given grade has but little bearing on the subject from an economical standpoint. When the speed rises the adhesion falls to about 0.20 of the weight on drivers. The adhesion need only equal the train resistance. From this it is seen that the heavier engine is carrying a good deal of excess weight except at very slow speeds.

The electric locomotive No. 1 New Type has a tractive power at starting which is less than that of the consolidation, but can maintain this power until 17 m. p. h. is reached. The electric locomotive would probably be able to arrive inside the time limit with all it could start when the consolidation and the Mallet would not. This is an extreme case, but it illustrates the idea that the locomotive to be used as a criterion should be properly designed for the engine district. The electric locomotive will be with us some time in the future and its peculiarities should be considered when large expenditures are made.

The only correct method of handling the subject in the opinion of the writer is to devise a set of tables of accelerations and retardations (See *Railway Age Gazette* of August 23, 1912), or curves showing the same thing graphically. From these speed curves can be made for any given engine and load on any profile. They duplicate the train movement, and the comparison of the loads will give a basis for computation along economic lines.

It is easy enough to say that when the starting resistance is 13 lbs. per ton we may fix the economic grade by the following:

$$\begin{array}{rccccccc} \text{Starting Resistance} & = & \text{Grade Resistance} & + & \text{Train Resistance} \\ 13 & = & & + & 6 \\ & & \times & & \\ & & \times = 7 & & \end{array}$$

Equivalent grade is 0.35 per cent.

All this shows is that on a +0.35 per cent. grade the sidings should be level or on a minus grade when the engine is rated at all it can start.

In this connection, attention may be called to the fact that gravity furnishes the only power that a railroad gets for nothing. It can be used both to stop and start trains. All trains should stop just beyond the apex of a grade for ease in starting. This should not be done with the expectation that the engine will haul more in summer, but it will increase the rating for the winter months. If it is necessary to put a siding on a maximum grade for the use of up-bound trains, it should be operated from one end and lead out along the face of a hill. The train would back into it and a slight adverse grade would aid starting again in cold weather. It seems difficult to anticipate all the needs of block signaling, but it does not seem difficult to build humps for them. The advent of the electric locomotive will change conditions in a good many ways, and it now seems probable that they will be given such a load that they can cover two of our present districts with one train crew.

In conclusion, the statement may be made that the problem is one of virtual grades and speed curves so surrounded by operating conditions that it is unsafe to draw conclusions from similarities based on grade lines alone.

RAILWAYS PROJECTED IN ITALIAN SOMALILAND.—The Colonial Ministry of Italy has sent an engineer to Benadir, Italian Somaliland, Africa, to study the plan for construction of railways in Benadir.

P = Steam pressure.

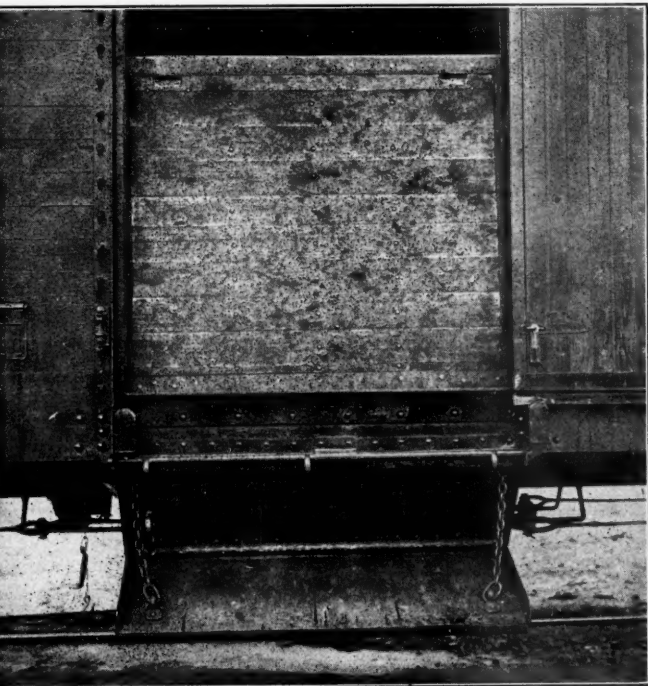
d = Diameter of cylinder in inches.

D

BOX CAR FOR GRAIN AND COAL TRAFFIC.

The construction of a suitable grain door has always been one of the most difficult problems in car design. Such a door should hold grain as securely as any other part of the car body, should be immediately available when required, should not be demol-

ished in unloading, nor obstruct or decrease the lading room when not in use, and should be of reasonable first cost and low cost of maintenance.



Exterior of Car with Hopper Open and Grain Door in place.



Interior of Box Car Showing Grain Door and One Open Hopper.

To meet these requirements the Canadian Pacific has built

from previous designs in that it is hinged at the bottom and is almost vertical; it has no closing shaft but is closed by hand and secured by a shaft having projections which engage the edge of the door at different points. The ends of the doors



Canadian Pacific Hopper Bottom Box Car for Grain and Coal Traffic.

have flanges which enter pockets or grooves formed by plates on the ends of the hopper. The grain doors are formed by sections of the floor at the doorway folding against the door posts. These doors are thoroughly reinforced and should be easily maintained in good condition. The whole construction is simple and strong, and as the hoppers are not subject to corrosion to the same extent as those of open coal cars, they should, excluding damage in wrecks, last the life of the car. In building the cars, each hopper is filled with flaxseed, which is then hammered and the hoppers are made absolutely tight under this test; it is claimed that this is the most severe test possible with the exception of water.

One of the principal reasons for the development of this car was to secure one which would be suitable for carrying coal in one direction and grain in the other, avoiding to a large extent empty mileage and the hauling of other cars for coal.

In dumping grain the same elevator arrangement is used as with the ordinary car. To unload a car of grain, the pin which holds the clamping shaft handle is driven out, which allows the hopper door to open and about 50 per cent. of the load runs out almost as fast as the elevator can take it away; the floor door is then unlatched, and pushed down and the remainder of the load is taken out through the side doors in the usual manner. It has been found that the employment of this method saves about one-third of the time which it ordinarily takes to unload a box car.

The hopper door arrangement increases the weight of the car about 800 lbs. compared with a car not fitted with grain door equipment, but when compared with a car fitted in the ordinary way for grain traffic this difference is reduced by the weight of the grain door and fittings. The cost of maintenance of the ordinary door and fittings, including the usual nailing strips on the door posts, has been estimated at from \$6 per car per year upward, which is eliminated in the hopper bottom car. The additional cost of applying the hopper bottom and folding grain doors is approximately \$50 per car. Where ordinary grain doors are used a force of men is engaged at elevators in removing nails from the door posts and inside lining and getting the cars ready for load, while with the hopper bottom car this force, as well as the shipping of temporary grain doors back to the point of loading, is almost entirely done away with, thus effecting an additional saving.

Short sections of Z-bars are applied on the inside of the door posts above the folding grain doors so that when the lading extends to a point higher than the folding doors, boards can be dropped into the slots thus formed and the load carried to any desired height.

These cars are giving excellent satisfaction in service and are sought by the elevator men in preference to other cars. The hopper and grain door arrangement is the invention of R. W. Burnett, general master car builder, Canadian Pacific, and is being patented by him.

PROJECTED CHINESE LINES.—There are at present three projected railways in northern Kiangsu, including the short line from Liuhaokow to Siennumiao. This short line will bring Yangchow and Siennumiao into close touch with Tungchow in the east and Tsingkiang-pu in the north. It will also enable the northern cities to get into quick communication with southern cities through Chinkiang, which is on the Shanghai-Nanking Railway. The Tsingkiang-pu-Tungchow line will pass through the following cities: Tsingkiang-pu, Hwaiian-fu, Paoying, Kaoyu, Shaopo, Taichow-ku, Rukao and Tungchow. On the completion of the Tungchow line an extension may be made to Haimenting. Haimenting, Hwaiian-fu, Yangchow and Haimenting are salt manufacturing centers, and there is no doubt that these projected railways will have an important bearing on the salt transportation problem. The railway will give rapid transit, regular and efficient service and cheaper freight, and the government will reap great financial benefits by it.

RAILROAD COST AND EFFICIENCY.

By A STUDENT.

The possibility of allocating, either to the freight or passenger service, the many different items of cost in railroad operation has a very vital significance in the attempt to determine the cost of any particular service. It is universally agreed that a portion of the expenses cannot be allocated except upon the merest guess work, but as to how large a portion is indivisible is still the subject of dispute; I am inclined to accept the conclusions of Mr. Ackworth, who writes as follows concerning maintenance of way and structures:

"With the exception that a portion of the expenditure on stations and buildings can be allocated to passengers and goods, respectively, the whole of this expenditure is incurred not for any separate class of traffic, still less for any of the separate components of that class, but for the traffic of the line as a whole."

Concerning maintenance of equipment:

"So far, then, we have analyzed an expenditure of . . . and found that roughly three-quarters of it is incurred on behalf of the traffic as a whole, and only one-fourth can be allocated even to the extent of dividing passengers from goods, and that this quarter itself is not practically susceptible of any further detailed allocation."

Concerning conducting of transportation:

"Once more it will be noticed that only two items of quite trifling importance, 'loss and damage' and 'injuries to persons,' have any specific reference to passenger or goods traffic, respectively. The point must not be pushed too far. No doubt a much larger portion of the expenditure could be apportioned. A driver drives either a passenger or a goods train, and his wages might be apportioned accordingly."

"As the result, then, of our inquiry into railway expenditure the conclusion seems naturally to emerge as we reached in the case of railway capital. The bulk of the expenditure is incurred on behalf of the traffic as a whole; only a small portion can be even allocated so far as to say that it belongs wholly to passenger, or wholly to goods."

With the manifest impossibility of making accurate allocations, which would be acceptable to opposing interests, would it not be better to turn attention to combining the two services as an alternative method?

The railroad is a manufacturing entity with product of two distinct types, namely, the transportation of freight and the carriage of passengers. To ascertain its gross product it is necessary to find a method for reducing the units in each class of service to a common denominator. At the present time there exists no physical means by which a ratio between a passenger unit and a freight unit can be determined, consequently some other means of arriving at their relative value must be sought.

The law of supply and demand, which takes into account all conditions between the buyer and seller, the producer and the consumer, a vital part of which is the price, or rate; a law, which is effective in the market for service given by the railroads as in all other departments of human exchange, would seem to give the means for constructing a measure by which to approximate a true ratio between the two classes of service.

In any market the revenue rate per passenger mile and per freight ton mile is what the community will give up to secure the service, and exhibits the value of that service. The rates for both services may be more than is necessary to give a fair return upon the capital actually used in the service, or there may be inequalities between the relative charges for either service, without materially affecting results obtained through use of the ratio; particularly is this true when the ratio is obtained by using the average rates over a large territory.

Taking the Interstate Commerce Commission's statistical report for the year 1910, we find the average rates to be as follows:

Group.	Passenger.	Freight.	Ratio.
1	1.718	1.115	1.45
2	1.695	.641	2.64
3	1.846	.588	3.14
4	2.176	.655	3.32
5	2.256	.802	2.82
6	1.887	.751	2.51
7	2.073	.945	2.19
8	2.079	.971	2.14
9	2.321	1.056	2.19
10	2.291	1.196	1.94
All United States	1.938	.753	2.58

It is, of course, known that such averages are merely arithmetic, that no traffic is carried at exactly these rates, that the charge upon any particular class (commutation, through or local tickets, silk, satin, or ore rates) bears no definite relation to this general average. If the data of ton miles and passenger miles, segregated to the respective rates, were available, we could obtain, by weighing, not only a more accurate average, but also the mode, and mean, in each class of service, and these would give bases for many enlightening deductions, which are not now possible.

As will be seen above, traffic conditions in different territories bring about a difference in the ratio between the classes; for instance, in New England the freight traffic is largely local and of a high class of commodities; it therefore approaches more nearly the passenger class, requiring only 1.54 ton miles to equal in value one passenger mile; on the other hand, Group 4, with the lowest amount of passenger service and an average class of freight traffic, shows that it requires 3.32 freight ton miles to equal a passenger mile.

It would be manifestly improper to form any conclusions as to reasonableness of rates in either service from this ratio; passenger trains must be run upon necessary schedules whether passengers present themselves or not, rates on freight must be adjusted to the character of the commodities available for transportation, that is, to the value of the service, so that the large ratio in case of Group 4 may, or may not, be justified by the conditions in that territory; yet in view of all the elements comprised in the law of supply and demand, which includes the fixing of rates at which the consumer will take the service offered, it is logical to assume that the burden upon the two types of service is approximately the same as is their respective value to the community which consumes them.

At any rate, it gives a uniform measure by which to test the efficiency of operation on the railroads serving that territory.

Using a constant, say 100, to secure a larger divisor, and by which to equate the two classes of service for a common denominator, the following formula is developed:

$$\frac{100}{\text{The market rate per pass-mile}} = \text{one passenger unit.}$$

$$\frac{100}{\text{The market rate per ton-mile}} = \text{one freight unit.}$$

$$\frac{\text{Passenger miles}}{\text{Passenger unit}} + \frac{\text{Freight ton-miles}}{\text{Freight unit}} = \begin{cases} \text{Total service units} \\ \text{of equated value.} \end{cases}$$

Here we have the total product of any road to which the formula is applied, and comparison of expenses per unit, and of utilization of power and carrying capacity for all roads within the same territory and subject to the same market conditions, may be derived.

Possibly an illustration taken from some other field may remove preconceived relationships and exhibit the process in a clearer light. Take the case of two farmers whose expenses are indivisible and assume that their product is confined to apples and potatoes; that the market rate for apples is two cents each and for potatoes 0.8 cents each. Here we have an example that is analogous to the railroad situation:

Farmer A produces 20,000 apples and 160,000 potatoes.
Farmer B produces 30,000 apples and 120,000 potatoes.

A's apples being above the average bring him 2.5 cents each, his potatoes the normal market rate.

B's apples are inferior and he can get but 1.75 cents each, his potatoes are better and bring him .95 each.

Their expenses are: A, \$1,000; B, \$800. Using the formula, we find:

A's apples.....	$\frac{20,000}{50}$	=	400 apple units
potatoes.....	$\frac{160,000}{125}$	=	1,280 potato units
Total units produced....	1,680		
B's apples.....	$\frac{30,000}{50}$	=	600 apple units
potatoes.....	$\frac{120,000}{125}$	=	960 potato units
Total units produced....	1,560		
COSTS PER UNIT.			
A's	$\frac{\$1,000.00}{1680}$	=	59.52 cents
B's	$\frac{\$800.00}{1560}$	=	51.25 cents

The costs per unit here obtained have no connection with the price that the two farmers received for their produce, as will be seen by:

A's apples at 2.5 cents	\$500.00
Potatoes at .8 cents	1,280.00
Total	\$1,780.00
B's apples at 1.75 cents	\$525.00
Potatoes at .95 cents	1,140.00
Total	\$1,665.00

Applying this method to the railroad costs, and using the market rate for the territory served, gives a very close approximation to the aggregate of physical units in the total product; it would require a very decided change in the average rate to materially affect the relative measurement of the passenger and freight units.

Taking the average rates as given above for the different groups and equating them by the use of the constant 100, we obtain the following results:

Group.	Passenger miles to unit.	Ton miles to unit.
1	58.2	89.7
2	59	156
3	54.1	170
4	46	152.7
5	44.3	124.7
6	53	133.1
7	48.2	105.8
8	48.1	103
9	43.1	94.7
10	43.7	80.5
All United States	51.7	133

As the ratio of rates is practically stable in the same territory from year to year, it is immaterial which year is taken as a basis.

Taking any road and dividing its passenger miles and the freight ton miles by their respective units and adding results gives the total number of physical units given by that road from which the costs per unit can be obtained.

Railroads in serving the community produce the units absorbed by that community; some at a high cost per unit and some at a low cost per unit; according to the internal, or external, conditions under which they work.

There is little, if any, connection between this unit cost and the revenue received for any class of traffic, therefore no attempt should be made to allocate these costs to the different classes of traffic; even though tests show that a division of the expenses for conducting transportation, made by multiplying the passenger units by cost per unit, agrees very closely with the auditor's determination, where he can most surely make accurate segregation. This tends to corroborate the essential relation between costs and the value of the service as expressed in the average rate. The only contention here made is that by reducing passenger miles and freight ton miles to a common denominator the gross physical service units produced by any railroad can be determined, and, with this product as a divisor, not only the costs but the relative efficiency of operation may be determined within a small margin of error.

TRANSPORTATION AND CAR ACCOUNTING OFFICERS.

The summer meeting of the Association of Transportation and Car Accounting Officers was held at Charlevoix, Mich., June 25 and 26, with 97 members present and President J. M. Daly in the chair. At the opening session an address was given by A. Patriarche, assistant to the president of the Pere Marquette. Mr. Patriarche spoke of the greatness of Michigan and concluded his remarks with a brief outline of early railroad history in the state, showing the vast growth of transportation facilities. The association was also addressed by Col. B. W. Dunn, chief inspector of the bureau of explosives. Col. Dunn outlined the origin of the bureau and the work accomplished to date, showing the great reduction in the loss of life and property. He gave details as to instructions to agents and other railroad employees handling dynamite and other dangerous articles, and showed by photographs the wonderful improvement made in the transportation of dynamite, etc., since the enforcement of uniform rules.

The executive committee reported a membership operating 257,679 miles, and having in service 2,582,190 cars. Seventeen additional railroads were admitted to membership at this meeting. The association approved the action of the executive committee in its recommendation to the American Railway Association, that any adjustment found necessary under the elimination of per diem Rule 5 should be by action of the executive or traffic departments.

Forms proposed by the committee on car service, to be used by shippers in ordering empty cars, were returned to the committee for further consideration. The opinion of the committee on car service that a continuous home route card is impracticable was not concurred in by the association, and the executive committee was directed to appoint a special committee to study the subject. The recommendation of the committee with regard to proposed addition to Rule 15, of the code of car service rules, was adopted for submission to the American Railway Association, as follows:

"First—The delivering road shall pay cost of transfer or rearrangement—

"C—When transfer is necessary for the protection of perishable freight."

The recommendation of the committee on car service, that Rules 7 and 8, of the code of per diem rules (pertaining to the application of per diem on cars handled under M. C. B. home route cards, and cars held awaiting receipt of repair material from owner), be abolished, and a new rule substituted therefor, was returned to the committee for further consideration. The action of the committee in recommending to the American Railway Association certain changes in the definitions with reference to the terms "member road" and "non-member road" as previously recommended by this organization in its proposed amendment of Rule 6, of the code of per diem rules, was approved by the association. The recommendation of the committee that the term "inside height" as applied to closed cars should show the measurement from floor to carline at side of car, and that where figures carried in registration do not represent that particular measurement they be revised accordingly, was approved by the association. The association adopted for submission to the American Railway Association a proposed form of agreement between railroad companies and consignees to apply where other than written notice of arrival of freight is requested. The association adopted, for submission to the American Railway Association, the recommendation of the committee on car service that, where cars are held under per diem rules 14 and 15, a charge of not less than 45 cents per car per day (to be determined by per diem reclaims accepted) be paid to the holding road by the connecting line failing to accept cars at junction point, in addition to the reclaim already provided

for by per diem Rules 14 and 15. The recommendation of the committee on car service that no reclaims should be presented or allowed under Rule 15, of the code of car service rules, was adopted by the association for submission to the American Railway Association. (Rule 15 relates to the transfer or rearrangement of lading at junction points.)

The committee on office methods and accounting reported that 299 private car companies have to date adopted the reporting marks assigned by the committee, and are applying them to their cars. The assignment of these marks by the committee is under authority of the American Railway Association. The committee submitted in the appendix to its report a list of private car owners in the United States, Canada and Mexico, as compiled from the committee records. The association approved the action of the committee in recommending to the American Railway Association that the wording of Rule 9 of the code of per diem rules be changed so as to make it clear that interchange reports should be numbered consecutively for each connecting line. The recommendation of the committee on office methods and accounting, that junction card Form D1 be changed to permit of the form being used either as a junction card for the purpose of reporting junction movements thereon, or for the purpose of attaching thereto the cut-up slips obtained from the self-transcribing form of interchange report, was approved by the association for submission to the American Railway Association. The form submitted by the committee was also approved. The recommendation of the committee that interchange report Form B1 be printed on distinctive colors of paper and that the colors be pink for delivered and canary for received, was adopted for submission to the American Railway Association.

The report of the committee on handling railroad business mail, indicating a method for eliminating envelopes in the handling of certain reports on home roads by the use of a small paster for sealing the open edges of the folded report, was accepted.

The blank submitted by the committee on conducting freight transportation for reporting cars set back to connections, and the recommendation that a charge be made against the erring road for each car delivered in error, were adopted for submission to the American Railway Association.

The code of car service rules covering the handling of passenger equipment cars, as submitted by the committee on conducting passenger transportation, was adopted, with some modifications, for submission to the American Railway Association.

Officers for the ensuing year were elected as follows: President, F. Price (Grand Trunk); first vice-president, J. M. O'Day (Illinois Central); second vice-president, J. T. King (Atlantic Coast Line); secretary, G. P. Conard, 75 Church street, New York; treasurer, F. M. Luce.

The next meeting of the association will be held at Galveston, Tex., December 9 and 10 next.

ARMOUR FAVORS RATE ADVANCES.

J. Ogden Armour, president of Armour & Company, on returning from Europe recently, was quoted as saying that he favored granting the request of the railways for an increase in rates. "All rates should be increased at once," said Mr. Armour. "They are far too low for the investors to get a fair return for their investment, and increases in the rates would result in an immediate improvement in all branches of trade and commerce. Everybody should be willing to have the rates raised, when all would find improvement and everybody would profit thereby. There is too much interference in this country by the government in the manner in which the railroads conduct their business and the rates for the carriage of all sorts of freight are now far too low. I, as a shipper, would like to see the rates increased, and all men of business ought to feel that way."

PROPOSED NEW RAILROAD LAW IN MAINE.

The Legislature of Maine has passed a law to establish a public utilities commission in place of the railroad commission, and the law was to have gone into effect this week (July 12); but it is expected that when the governor and council meet on Saturday to make the preliminary arrangements, they will be handed a petition, signed by ten thousand voters, asking that the law be submitted to a referendum. It is understood that the ten thousand names have already been secured, and that, therefore, the present railroad commission and the water storage commission will continue in office until an election can be held.

The next step after the filing of the petition, according to the provision of Maine's initiative and referendum law, will be for the governor to name a date for a special election to vote on the act. This special election cannot be held sooner than four months after the notification by the governor, that is, not earlier than next November. In case the governor does not name a date for a special election, the voters will register their opinions on the matter at the next general election, to be held in September, 1914.

Opponents of the public utilities act, who are mostly on the Democratic side, the principal proponents of the measure being Republicans, make objection to the fact that the appointees on the board will all be lawyers, who, they say, have not had experience in the matters they are called upon to decide. They further add that the commission will cost the state \$100,000 a year, and is an unnecessary expense. They do not offer anything in place of the act, saying that the present state of affairs is satisfactory.

The new law, which is Chapter 129, consists of 72 sections, and in general contains all of the stringent and the sweeping provisions which have been embodied in recent state statutes of this kind, such as those of New York, Massachusetts and West Virginia. We note its salient features.

The governor is to appoint three commissioners, who are to be confirmed by the council. The governor designates one as chairman, and the term of each will be seven years, the terms of different commissioners to overlap. Salary of chairman, \$5,000; each other commissioner, \$4,500; clerk, \$2,500; assistant clerk, \$1,500. The law applies to railroads, street railroads, express companies, car companies, car loaning companies, and every instrumentality of a common carrier; gas plants, electric plants, telephone and telegraph lines, water companies, wharfingers and warehousemen. The commission will have authority to inquire into the management of the business of all these, and every public carrier, and public utility must furnish all desired information or give reasons for failure to do so. The commission is to report to the attorney general all violations of the law, and county attorneys, on request, must aid the commission in investigations. Every public utility must furnish safe, reasonable and adequate facilities, and demand only reasonable and just rates.

The commission, in prescribing forms for accounts, shall "consider" any system of accounting established by any federal authority, and any system authorized by a national association of utilities (i. e., the association of railroad accountants and that of electric railroad accountants). Any public utility engaged in a subsidiary business shall, if ordered by the commission, keep separate accounts thereof. No public utility shall keep any account, paper or record except as approved by the commission; but no requirements shall be made conflicting with the federal law.

Every public utility must file tariffs, and the rates must not exceed those which were in force January 1 last. Tariffs shall be published to such extent as the commission shall deem necessary. Rates in tariffs must not be changed except on ten days notice and publication. All rates not shown in tariffs are unlawful.

Section 27 is a revision of Section 55 of the existing law, regulating the organization of corporations to operate telegraphs and telephones, or to make or supply gas or electricity.

Section 32 prohibits rebates, discrimination, etc. Free transpor-

tation, reduced rates, etc., are prohibited, with exceptions like those in the federal law.

Section 33 provides for the investigation of any accident resulting in loss of human life, on the premises of any public utility, arising from its maintenance or operation.

Section 34 empowers the commission to fix a reasonable value upon property of any public utility used or required to be used in its service, whenever it deems a valuation thereof to be necessary for the fixing of rates.

Section 35 regulates the issuance of stocks, bonds, etc., which must be approved by the commission. The commission may, at the request of any public utility, approve the issue of stocks or bonds heretofore authorized but not issued. All sales or leases of property shall be subject to approval of the commission. No public utility shall purchase or acquire any part of the capital stock of any other public utility, etc., without authority from the commission.

The commission may order physical connections of telegraph and telephone lines. It may authorize one public utility to use the tracks, conduits, wires, etc., of another public utility in any public street, under suitable restrictions.

Section 41, which provides for making complaints, calls for a written statement, signed by ten persons, firms, corporations or associations who are aggrieved. When rates or service are found insufficient or discriminatory the commission shall have power to fix and order reasonable rates, service, etc. When a rate is changed by the commission the public utility shall not thereafter make further changes without an order from the commission.

The commission may, on its own motion, investigate whenever it is believed that any rate is unjust or unreasonable or any service is inadequate, or cannot be obtained.

Questions of law may be raised by alleging exceptions to the ruling of the commission, and the cases carried to the Supreme Judicial Court. While questions of law are pending on exceptions, no injunction shall be issued to suspend or stay an order of the commission. No person shall be excused from testifying on the ground that the testimony may tend to incriminate him or to subject him to a penalty; and no person so testifying shall be prosecuted except for perjury.

Section 60 authorizes the commission, in emergencies, to temporarily suspend existing rates or orders.

The maximum penalty for violation of the law is \$1,000 for each offense; but a director officer who authorizes the issue of stocks, notes, etc., contrary to this law, shall be liable to imprisonment for not less than one year nor more than ten years; and making a false statement to secure the issue of stock, etc., is subject to fine and imprisonment.

No public utility shall apply to the legislature for anything which the commission can grant until it shall have first exhausted its rights in that behalf before the commission.

QUEENSLAND RAILWAY EXTENSION.—Queensland has entered upon a policy of railway extension which will result in hundreds of thousands of acres being opened up for settlement. The new line from Oakey to Cooyar, which has just been opened by the Minister of Railways, is 38½ miles in length, and for its whole length it may be said to open up agricultural country capable of vast development, and on the Cooyar side of the range it taps country teeming with valuable timber.

INDIAN RAILWAYS IN 1912.—Indian railways as a whole enjoyed, in 1912, the best year they have experienced both in the matter of gross and net earnings and in the percentage of net earnings to capital outlay on open lines, which, at 6.77 per cent. was considerably higher than the return of 6.07 per cent. obtained in the exceptional year 1905. This return of 6.77 per cent. is exceedingly satisfactory, comparing as it does with 5.87 per cent. in the previous year. To the state itself the net earnings from state and guaranteed lines yielded a return of 5.19 per cent. on capital as against 4.37 per cent. in 1911.

TURNTABLE TRACTOR.

The illustrations show a type of turntable tractor which is made by the Weir & Craig Manufacturing Company, Chicago. It is designed to readily move the largest turntables when loaded with Mallet or other heavy locomotives and also to stand practically as an independent unit on the pit rail, so that no shock or vibration will be communicated to it or any of its parts when the locomotive is placed on the table; this is obtained by connecting the main frame to the table by sliding links.

Trouble has been experienced in some designs of tractor owing to the fact that the entire machine was pivoted on one wheel and a comparatively rigid connection made to the table. Con-

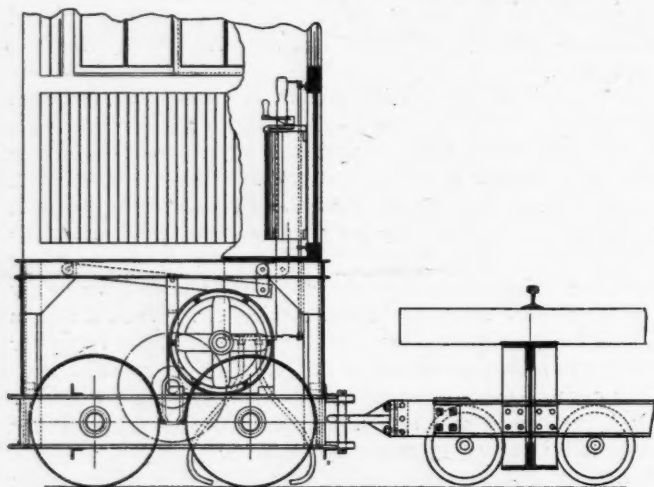


Fig. 1—Turntable Balanced, with Truck Wheels Slightly Above Rail.

siderable shock and vibration was thus communicated to the tractor, causing trouble with the wiring to the motor and the controller, as well as with the bearings and other parts, and this method of eliminating the vibration should reduce the cost of maintenance and increase the efficiency of the device. The tractor is designed, primarily, for electric power but may be equipped with a compressed air motor if electricity is not avail-

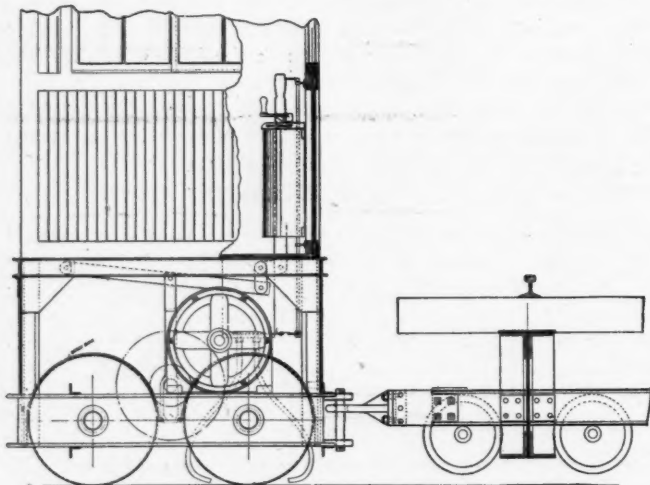


Fig. 2—Turntable in Its Highest Position Relative to the Tractor.

able, in which event the air motor may be replaced by an electric motor at any later time without alterations to the remainder of the machine.

By reference to the diagrams it will be seen that the tractor remains on the rail in its normal position, regardless of any vertical movement of the table. Fig. 1 shows the table balanced

with the truck wheels slightly above the rail; in this position the sliding link connection is in line with the main portion of the frame. Fig. 2 shows the table in the highest position, caused by a locomotive passing on at the opposite end, the sliding connection in this case being at the upper portion of the frame. Fig. 3 shows the table in the lowest position, the reverse of Fig. 2, with the truck wheels resting on the track, a position assumed

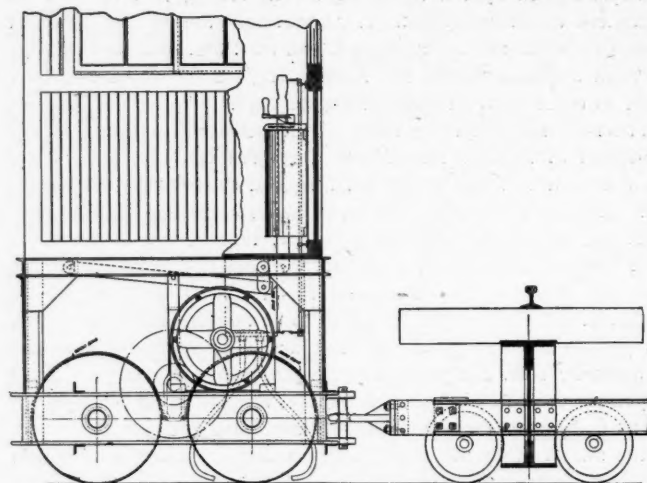


Fig. 3—Turntable in Its Lowest Position Relative to the Tractor.

when the locomotive passes to the tractor end of the table. It will be noticed that whatever the position of the table, the tractor remains stationary.

Fig. 4 shows the machine with the housing removed and part of the cab cut away. This view shows the location of the tractor wheels, gearing, sanding device, brake lever, motor, etc. The cab is furnished with sliding windows and is 4 ft. 6 in. x 5 ft. 6 in., providing abundant room for the operator after the installation of the apparatus. The traction wheels are 30 in. double

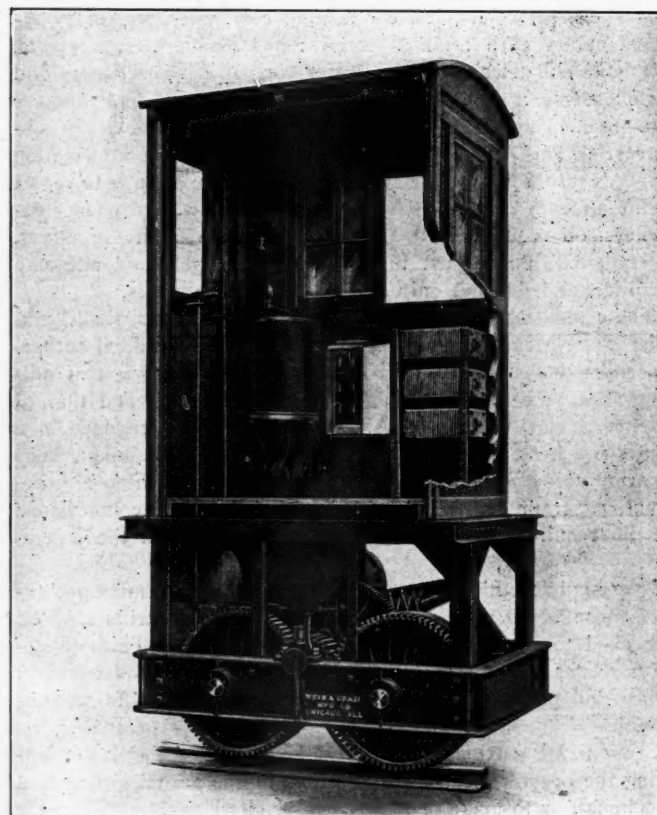


Fig. 4—Arrangement of Apparatus on Turntable Tractor.

plate, with flat chilled treads, and each is furnished with a steel driving gear, securely bolted to a faced shoulder on the inside of the wheel; all the gears and pinions are steel, carefully machined and are accurately cut. The electrical equipment may be furnished according to the railroad company's specification.

Steel band brakes, controlled by a hand lever in the cab, are applied to each of the wheels and have a positive action, avoiding the danger of stripping the gears as may be the case when brakes are applied to a drum on the motor or intermediate shafts. The positive action of the brake removes the temptation or the necessity on the part of the operator to reverse the motor in order to stop at a given point, thereby materially reducing maintenance charges on the electrical equipment.

The sanding device consists of a cast iron hopper which is tapered to the bottom and contains about $1\frac{1}{2}$ cu. ft. of sand; it is furnished with a cast iron cap set level with the floor of the cab and the hopper can be filled from the inside of the cab, so

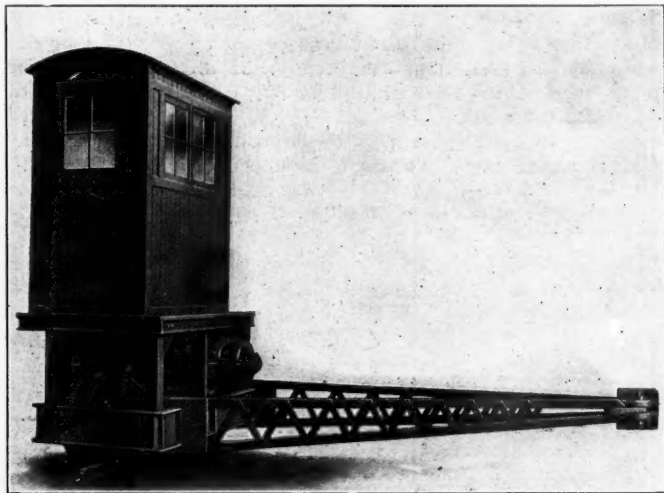


Fig. 5—Turntable Tractor.

that there is no opportunity for the sand to get wet; the plug valve in the bottom of the hopper is controlled by a lever in the cab.

The frame, which carries all the equipment, is of a heavy design and is cast in one piece; a structural steel frame, on which the cab rests, is riveted to it. The sliding link which connects the tractor to the table is fastened to this frame. As shown in Fig. 5, this frame is supplemented by a structural steel A-shaped frame which extends toward the center of the table and is also connected to the girder by a sliding link. The motor and all the working parts are enclosed by sheet steel plates in which are provided doors of ample size; all the working parts are thus easily accessible for inspection and repairs.

INDIAN PASSENGER TRAFFIC IN 1912.—The number of passengers carried on the railways of India in 1912 reached a total of 417,230,000, against 389,860,000 in 1911, while the earnings therefrom increased from \$61,636,000 to \$65,216,000. As usual, far the greater part of the passenger revenue came from the third-class, 375,566,800 passengers in this class having produced earnings of \$56,711,665, showing an improvement of 27,090,000 in numbers and of \$4,273,330 in receipts. First-class traffic, which, with one or two exceptions, produces no profit to Indian railways, reached the comparatively insignificant total of 795,500 in numbers and \$2,096,665 in receipts. At the same time this is an improvement on every previous year except 1911, when the Coronation Durbar traffic made a special increase in first-class earnings. The Great Indian Peninsula, the East Indian and the North Western State Railway had the largest share in this traffic in 1912.

General News.

A telephone circuit for despatching is being put up by the Denver & Rio Grande between Grand Junction, Col., and Ogden, Utah, 328 miles. The cost will be about \$50,000. "Blind" sidings will be equipped with telephone boxes, and all trains will carry instruments.

Illinois Central southbound passenger train No. 1 was held up near Batesville, Miss., early on July 4, by two men who boarded the train just south of Batesville, cut the express, baggage and mail cars from the train and ran them ahead about 5 miles. They dynamited the express safe and are said to have obtained a large sum of money. After blowing the safe the men ran the engine to Pope, about 3 miles farther, and abandoned it.

The Chicago city council committee on railway terminals on July 7 unanimously endorsed the appointment of John F. Wallace as engineering expert to make a report to the committee and act as its adviser on the subject of proposed railway terminal locations in Chicago. The selection of Mr. Wallace, as announced last week, was made by a subcommittee, and an effort was made by some members at the meeting on Monday to employ a committee of three or five experts instead of one. Such a plan was proposed in resolutions submitted by the City Club to the committee, but after discussion it was voted down.

The Southern Pacific Company is saving \$1,000 a month by using old boiler tubes. These will no longer be sold as junk, but will be pieced together at the shops and used for piping water and air about the yards of the company. H. C. Pearce, general storekeeper, has returned from Los Angeles, where this experiment in salvage was tried out, and says that about \$12,000 has been saved in the last year by this new economy. The tubes will be gathered together at all roundhouses and shops, shipped to the general stores, cleaned, turned for screw connections and then redistributed for pipe purposes instead of new material.

Beginning on August 1, all passenger trains of the Chicago & Eastern Illinois running to and from Chicago will arrive at and depart from the Dearborn station, instead of the LaSalle street station, using the tracks of the Chicago & Western Indiana. The Chicago & Eastern Illinois is one of the five roads that own the stock of the Western Indiana, but for several years its trains have used the LaSalle street station of the Chicago, Rock Island & Pacific and Lake Shore & Michigan Southern roads. In order to provide for passengers who go to the LaSalle street station by mistake, omnibuses will be run to take them free of charge to the Dearborn station.

In preparation for greater fruit crops, the Pacific Fruit Express is building a large new ice manufacturing plant at Los Angeles. It will be completed in October, will have a capacity of 85 tons daily, and will cost \$125,000. The design is such that, by the installation of another unit of machinery, the capacity can be increased to 170 tons daily. Storage room will be provided for 15,000 tons. The building will be of concrete construction. Icing platforms will care for 20 cars at one time, so that fruit can be moved promptly without delay in refrigeration. The ammonia condensers will be of a new type. The entire output is to be used for the rapidly increasing refrigerated shipments of fruit through Southern California and in icing Southern Pacific passenger cars at the Los Angeles station.

The educational bureau of the Union Pacific, the Illinois Central and the Central of Georgia, which has heretofore carried on several correspondence courses for the employees of these roads, besides conducting the educational features of the shop apprentice system, has been reorganized so that now the correspondence courses are handled by the educational bureau as a separate organization; a nominal charge of \$1 per month being made to employees desiring to participate in the correspondence courses. In the work of the bureau the above named roads will cooperate, and it will continue the same as before except for the small charge for instruction. D. C. Buell, chief of the educational bureau, will continue to be in charge and will be located at Omaha, Neb. The apprentice schools of these roads will continue as before the reorganization.

F. R. Anderson, of the Northern Pacific, speaking at the convention of the train despatchers at Los Angeles, on the advan-

tages of the telephone in train despatching, said that a train order of 35 or 40 words could be sent to four offices, and the repetitions received back, in from 3 minutes 20 seconds to 4 minutes, this including the time consumed in calling the offices. Speaking of emergencies, he said that not long ago a bridge, on the Northern Pacific, was carried out by an ice jam which formed very quickly. Repairers at work on the track discovered the break in the road, but they were on the opposite side of the stream from that on which a passenger train was approaching; but going a short distance to a telephone booth, the foreman was able to notify the despatcher of the trouble and this message was perhaps the means of saving the passenger train from going into the river. [This incident suggests that, where practicable, telephone and telegraph wires should be carried across rivers independently of the bridge which carries the tracks.]

The New York, New Haven & Hartford announces that its offer of \$10,000 for the best automatic stop has expired; and that 2,816 persons have entered the competition. Only 704 of the applicants have submitted plans; but any inventor who got his name on the list before July 1 will be allowed until January 1, 1916, to qualify. C. H. Morrison, signal engineer of the road, up to July 1 had written 4,062 letters; and 1,483 copies of patents had been obtained from the Patent Office. Of the 704 devices of which plans have been submitted not one has met condition No. 1, which reads: "The apparatus should be so constructed that the removal or failure of any essential part would cause the display of a stop signal and the application of the train brakes, and if electric circuits are employed, they should be so designed that the occurrence of a break, cross, or ground, or a failure of the source of energy in any of the circuits, should cause the display of a stop signal and the application of the train brakes." A few of the devices submitted might be made to meet this requirement. The company will proceed at once to test two devices on the western division, between Hartford and Newington. One of these is the invention of Mr. Webb, of the International Signal Company, and the other of an engineer of the Union Switch & Signal Company.

Chicago Terminal Plans.

Jarvis Hunt, the architect who has been urging plans for a central railway passenger terminal at Twelfth street, Chicago, has now submitted details of an additional feature of this proposed plan to provide for a loop around the business section of the city for suburban traffic. The proposed loop would be in a subway running north from the union station between Canal street and the Chicago river, straightened as provided in his original plan, to Indiana street; then east to Michigan boulevard and south along Grant Park or Michigan boulevard to Sixteenth street; thence west to Canal street. As this loop connects with the main station it would connect all suburban service with all through service; and provision is made for ten suburban stations located at convenient points around the loop.

The Union Station Company has published another full-page advertisement in the Chicago papers headed "Union Labor Endorses West Side Terminal," and quoting the resolutions adopted by the Chicago Building Trades Council endorsing the plan for the terminal station proposed by the roads now using the old union station between Jackson boulevard, Clinton street, Adams street and the Chicago river, together with similar resolutions passed by the Chicago Federation of Labor. The advertisement states that the proposed new west side terminal "will be a \$40,000,000 improvement to Chicago, and will necessitate the employment of thousands of workmen. Just as soon as the present plans for its construction are approved by the mayor and the city council work will commence."

Don'ts for Operators and Others on Railroad Telephone Lines.

Don't depend upon a high partition to separate one train despatcher from another; each should have a separate room; freedom from unnecessary noise is the first element of successful operation.

Don't fix station telephones to tables on which are telegraph instruments.

Don't allow any person—even the trainmaster—to usurp the despatcher's authority on the despatching circuit. Everything

except despatching should come on the wire by one of two courses, either through the despatcher's office or through application made to him by a station operator.

Don't use the despatching circuit unnecessarily for other business; the despatcher, with the receiving apparatus constantly at his ear, must listen to everything that goes over the wire; outside matters tend to distract him.

Don't criticize the despatcher, on the despatching wire, within hearing of the operators. (This is addressed to the trainmasters.)

Don't work under the disadvantages incident to induced currents and other imperfections; these can be done away with if proper effort is directed to that end.

[From a paper on Abuses of the Train Wire, by Hugh McPhee, superintendent of the Western Union Telegraph Company at Los Angeles, Cal., read before the Train Despatchers' annual convention.]

Automobile Accidents at Railroad Crossings Comparatively Few.

The bureau of news of the Southern Pacific has prepared a statement showing the very small proportion of automobile accidents that occur at railroad grade crossings, as shown by figures that have been compiled recently. In all the states of the Union, for a period from April 1 to May 23 of this year, out of 1,623 auto accidents, only about 1½ per cent., or 25, occurred where wagon roads cross a railroad track. The rest were away from the railroads. The statistics for the Pacific coast are:

	Number of Accidents.	Fatalities.	Serious Injuries.	Minor Injuries.	Total.
<i>California—</i>					
Escondido	3	1	2	0	3
Fresno	4	1	1	1	3
Long Beach	3	0	0	2	2
Los Angeles	29	10	12	47	69
Oakland	5	0	2	4	6
Oxnard	1	0	0	2	2
Pasadena	1	0	0	2	2
Sacramento	6	1	4	1	6
San Diego	8	0	1	5	6
San Francisco....	31	10	22	17	49
San Jose	9	2	1	4	7
Santa Cruz	1	0	0	1	1
Stockton	3	2	1	0	3

Nevada—None.

<i>Oregon—</i>					
Portland	13	4	5	7	16

<i>Washington—</i>					
Seattle	13	1	5	17	23
Spokane	7	0	0	7	7
Tacoma	1	0	0	0	0

All States 1,623 269 431 1,164 1,864

The only railroad grade crossing accidents with automobiles on the Pacific coast were:

	Number of Accidents.	Fatalities.	Serious Injuries.	Minor Injuries.	Total.
<i>California—</i>					
Fresno	1	0	0	1	1
San Francisco....	1	1	1	0	2

Merits and Demerits.

Honor-roll items and other paragraphs showing how railway employees are recognized by their superintendents when their conduct is exceptionally good, have been published in the *Railway Age Gazette* at numerous times during the past few years. Commenting on our editorial on this subject, printed in the issue of June 20, a correspondent suggests that both sides of the matter ought to be brought out; that exceptionally bad as well as exceptionally good conduct ought to be made generally known. Responding to this suggestion we print below the demerits and demerits on a division of the Rock Island road for two months. This is only a summary; it does not show the proportionate amount of inefficiency, for the total number of men employed, which would have to be known if proportions were to be calculated, is not given. Neither can the magnitude of the punishment nor the seriousness of the offense be estimated, except in a rough way. Each paragraph might be amplified to a half column, if it were desired to teach the lesson of the particular cases referred to. Some amplification is necessary, of course, if cases of this kind are used for the purpose of admonishing other employees. Indeed, it is often well to name the dates and the places, so that employees can fix the lessons in their minds in concrete form.

These paragraphs cover a period of two months ending May 31, 1913, and are as follows:

Two switchmen, two truckmen and an operator have been dismissed for violation of Rule G (relative to intoxicating liquors).

A passenger brakeman, a stower, a janitor and window washer have been dismissed on account of services not being satisfactory.

Two passenger brakemen have been dismissed for assignment of wages.

A passenger brakeman has been dismissed for absenting himself without permission.

Three switchmen have been dismissed for failure to report for work.

A helper has been dismissed for negligence in the performance of his duties.

A coal unloader has been dismissed on account of reaching the age limit.

A switchman has been dismissed for deserting his crew.

Four engineers, two firemen, one switchman, one passenger conductor and one passenger brakeman have each been assessed thirty demerit marks for being responsible for accidents.

A fireman has been assessed fifteen demerit marks for deserting engine in station, which resulted in delay to train.

Two engineers have each been assessed fifteen demerit marks for being responsible for accidents.

Two engineers have each been assessed thirty demerit marks for running between stations and trains.

An engineer and a passenger brakeman have each been assessed thirty demerit marks for disregarding signals.

A passenger brakeman has been assessed ten demerit marks for failure to protect his train.

A switchman has been assessed ten demerit marks for handling a loaded car as an empty, resulting in delay to same.

An engineer and a switchtender have each been assessed thirty demerit marks for being equally responsible for passenger train running through switch.

Two switchmen have each been assessed five demerit marks for being responsible for accidents.

Four switchmen and an engineer have each been assessed ten demerit marks for being responsible for accidents.

An engineer has been reprimanded for being responsible for accident.

Three passenger brakemen have each been assessed five demerit marks for not obeying instructions relative to playing cards.

Three engineers and two firemen have been reprimanded for violation of city smoke ordinance.

Four engineers and five firemen have each been assessed five demerit marks for violation of city smoke ordinance.

A fireman has been assessed ten demerit marks for violation of city smoke ordinance.

Two engineers and a switchman have each been assessed five demerit marks for being responsible for switches being run through.

A Medical Inspection Bureau for Employees.

The Brooklyn Rapid Transit Company, operating street surface and elevated railroads in Brooklyn, N. Y., has made permanent the medical inspection bureau which was started last December, for the purpose of providing free medical attendance to the operating employees and compulsory medical inspection preliminary to sick excuse. This bureau has made a record in the past six months in the reduction of the sick list which amply justifies the decision to make medical inspection a permanent feature. This idea grew out of an investigation by President T. S. Williams in 1911, when it appeared that material variations existed between the different terminals of the B. R. T. in the treatment of sick excuses. There had grown up a custom whereby it was considered the usual thing for men to report sick when in fact they wanted time off for purposes of recreation, and from this evasion of the letter of the law a tendency was observed to justify other evasions of operating requirements. The medical inspection bureau is based on the following propositions:

First. If a man is sick, it is contrary to the interests of the company, as well as the man, that he should be required to work.

Second. The proper individual to determine a condition of sickness or health is not an operating officer but a physician.

Third. When a man is excused on account of illness, it is quite as important that his recovery for work should be certified, as his original sick excuse.

Fourth. A proper amount of time off should be allowed for recreation, but recreative excuses should be granted as such, and not under guise of sick excuses.

There is a benefit association whose members had received (when they asked for it) free medical attendance from the association's physician, but since December 20, 1912, the medical inspection bureau has been in operation. Dr. H. H. Stearns, chief physician of the Employees' Benefit Association, was placed in charge of the bureau. When a man reports sick at his terminal, he is given an excuse card which entitles him to go to the nearest examination office at the next office hour to have his ailment diagnosed. The doctor at the inspection office examines him and either excuses him indefinitely, excuses him for a limited period, as in the cases of minor ailments, or in the event that it appears that the man is feigning illness, orders him to report back to his terminal, where discipline is administered. In case a man is excused indefinitely, he receives treatment during his illness at home or at the doctor's office, as the case may be, and upon recovery, receives a certificate saying when he is required to report back for work. In case a man reports ill from his house a doctor calls within six hours. The system has worked almost without a hitch, to the accomplishment of a very substantial reduction in the days of work lost on account of illness. In the first half of 1912 the aggregate sick list represented the loss of 44,459 days' work among approximately 9,000 employees, whereas in the six months ended June 30, 1913, the aggregate time lost on account of sickness was 34,148 days' work—a gain of 10,311 days' work, or 23 per cent.

The observation of the physicians in charge indicates that the gain is in a reduction of the time lost by men who are sick; in other words, a shortening of the period of illness. Under the old system a man contracting a minor ailment would work along with it until his case became aggravated, and then be absent for a week or more, whereas under the new conditions, men are coming more and more gladly to welcome the opportunity to receive treatment at the inception of illness, and return to work in 24 or 48 hours. An increasing number of men also are coming to the medical offices for treatment while on duty, and it is the policy of the company to be prepared at these offices to dispense directly simple remedies for such cases.

A Railroad Officer Very "High Up."

Charles S. Mellen, president of the New York, New Haven & Hartford, appeared before Coroner Phelan at Bridgeport, Conn., July 7 to testify concerning the Stamford collision but, after a long discussion, was excused from answering questions on the ground that he was an indicted defendant awaiting trial on charges of manslaughter growing out of the wreck at Westport, and that his answers might tend to incriminate himself or other officers also indicted. Questioned about Vice-President Whaley's authority, Mr. Mellen said:

"I would be glad to answer that if I were a free man, not under indictment. I have got to undergo trial, I think very unjustly. It was not because there was any thought that I was guilty that I was indicted, but it was done to coerce others into changing the line of their defense. I do not understand all these technical objections set up by counsel. I would like to talk frankly and freely as a layman, but I am yoked up with others in my indictment. If I answer the question about authority over tracks and trackage, may it not be—I am arguing as a layman—that I will incriminate those with whom I am yoked up, and so indirectly incriminate myself?"

From the report of the hearing we make the following extracts:

Mr. Mellen entered the court room at twenty-five minutes to three o'clock, and took a seat two chairs away from Charles J. Doherty, driver of the locomotive. Mr. Mellen wore a blue serge suit, a polka dot bow tie, black shoes and a very low collar. The clearness of his blue eyes was remarked upon.

"You are the president of the New York, New Haven & Hartford Railroad?" asked the coroner.

Mr. Mellen answered in the affirmative.

"Are your powers and duties prescribed by written rules?"

"I think not," said the witness. "I haven't seen any."

"Are there any oral rules in this regard?"

"Not that I am aware of. . . . In any matter the board of

directors seeks to take charge of it is supreme. The president can do nothing that the board of directors can't overrule."

"Mr. Mellen, how do you know your powers and limitations of powers, and how are you guided in determining things beyond your powers?"

"By experience and common sense and advice of counsel."

Asked about the powers and duties of the president and vice-presidents and how they were prescribed, Mr. Mellen declared that this was done by general custom.

"Are there any written rules concerning the duties of the vice-presidents?"

"Nothing, unless it is contained in the circular notice of their appointment. In railroad circles there is a well defined line of demarcation in this respect which is not specified in the notice or by any order of the president."

"How many vice-presidents are there in your company?"

"I think there are six, but I wouldn't be too sure; there may be seven and may be five."

"I'm a layman," said Mr. Mellen, "and I don't know the meaning of all these finely drawn points. I came here to testify at the advice of counsel. I am under arrest and am to be tried in September in connection with the Westport wreck. I have been told not to answer questions concerning my duties or the duties of others linked with me in the indictment. For my own part I don't see any reason for not answering certain questions, but as a layman I do feel that I should continue to trust my interests to my counsel. If not then I had better discharge my counsel."

"Who is the general superintendent?"

"Mr. Woodward, I think," said the witness.

"Do you know the scope of his duties?"

"I do not. He is a subordinate officer of Mr. Whaley. I do not come into contact with him, and do not think that I should know him if he came into this room. I don't recall that I have ever met him. The vice-president defines his duties."

"You have cause to regret not knowing Mr. Woodward, as he's a very fine gentleman."

"He might be," said Mr. Mellen. "We have thousands of them on the road, but I can't get to know them all."

"Is your division superintendent Mr. Droege?"

"I think so."

The witness said that the last named official reported to Mr. Woodward. Mr. Mellen said:

"He reports to the general superintendent. So far as the management of the railroad itself is concerned Mr. Whaley is head of all the people, general manager and general superintendent."

"Who is the superior of Mr. Morrison, the signal engineer?"

"Mr. Whaley. He hires him or he fires him, just as he chooses."

"I hope he won't want to fire Mr. Morrison, for he's a very fine gentleman."

"I hope he won't unless he deserves it," said Mr. Mellen.

"Who is it that has charge of the minutes of the board of directors?"

"The secretary."

"Are you above him in that regard?"

"I have no authority over him, as he is an officer of the board. I have no authority about that without the consent of the board of directors."

The Conductors' and Brakemen's Demands.

The committees of the conductors' and the brakemen's brotherhoods met in New York City this week and counted the votes of the members of those organizations on the question of authorizing the officers to strike, if deemed necessary, for higher wages on the eastern railroads; and on Tuesday they had a conference with the committee, Elisha Lee, chairman, representing the railroads. The vote was overwhelmingly in favor of a strike, the figures as given out being as follows: Conductors, in favor of strike, 11,808; against strike, 1,466; brakemen, in favor, 60,829; against, 1,631. The managers' committee refused to grant any increase in wages whatever; and the leaders of the brotherhood have called together the whole of their joint committee, numbering about one thousand men, to meet in New York City this week, Saturday, to decide whether or not to strike.

Speaking to a reporter, Mr. Garretson, chief of the conductors,

said that as the railroads had refused to arbitrate under the Erdman act, the brotherhoods would not appeal to the Washington authorities.

Of the total of 76,683 votes, 72,473 were in favor of striking if the roads refused to meet the men's demands and 4,210 were opposed to a strike. Eighty-nine per cent. of the voting conductors voted in favor of a strike, and 98 per cent. of the brakemen. The votes on some of the principal railroads were as follows:

Railroad.	Conductors.		Brakemen.	
	For.	Against.	For.	Against.
Boston & Albany.....	168	19	911	25
Boston & Maine.....	545	82	3,106	97
Baltimore & Ohio.....	1,193	43	6,403	54
Central of New Jersey.....	174	115	1,101	51
Cincinnati, Hamilton & Dayton.....	142	6	656	3
Cleveland, Cincinnati, Chicago & St. Louis.....	553	31	1,814	4
Delaware & Hudson.....	224	12	1,151	5
Delaware, Lackawanna & Western.....	327	28	1,324	21
Erie.....	532	115	3,322	23
Lake Shore & Michigan Southern.....	372	69	1,953	37
Long Island.....	157	5	650	4
Michigan Central.....	372	30	1,181	19
New York Central & Hudson River.....	888	127	4,596	48
New York, New Haven & Hartford.....	613	46	3,093	65
Pennsylvania—East of Pittsburgh.....	1,585	350	12,632	824
Pennsylvania—West of Pittsburgh.....	1,379	147	5,646	96
Philadelphia & Reading.....	685	87	3,244	103

Elisha Lee, chairman, last week published a circular, in which he said:

"The conductors and trainmen of the eastern railroads received increases of \$30,000,000 per annum in 1910, according to President Lee, of the Trainmen's brotherhood. As the wages of these employees now approximate some \$85,000,000 in a year, their total wages prior to the 1910 increase must have been \$55,000,000 or \$60,000,000. It appears, therefore, from President Lee's own estimate, that the trainmen and conductors in 1910 received an annual increase in wages of 50 per cent. Yet in spite of this, they are now asking for \$17,000,000, or 20 per cent. per annum additional. If the roads granted the increase now asked by the trainmen and conductors, it would mean that in three years increases in pay to employees in train service would amount to \$52,000,000 per annum, which is equivalent to placing on these properties a lien of \$1,040,000,000 of 5 per cent. securities having preference over first mortgage bonds. The conductors and trainmen in the eastern territory have practically uniform wages and working conditions, which are all-sufficient and exceedingly liberal. These conditions and wages were fixed by E. E. Clark, former president of the Order of Railway Conductors, and P. H. Morrissey, former president of the Brotherhood of Railroad Trainmen, who acted as arbitrators in the New York Central controversy in 1910. The very large increased cost to the eastern railroads of the increases in pay granted to the conductors and trainmen in 1910 as a result of the Clark-Morrissey award, is admitted by President Lee of the Brotherhood of Railroad Trainmen, who, in his report at the tenth biennial convention of that organization, estimated the increases in pay received by conductors, trainmen and yardmen in the East as a result of the brotherhood's activities as about \$30,000,000 per annum."

On Monday of this week the Erie formally withdrew from the railroad conference committee. J. C. Stuart, vice-president, writing to Elisha Lee, said:

"Similar proceedings have in the past resulted in increased wages and, while it may be possible for some roads to meet these increases, the Erie is not in a position to do so at present. The wage increase demanded of it amounts to an increase of 25 per cent., or a total annual cost on the basis of the present business of approximately \$1,200,000. To offset this increase without disturbing the net earnings (on basis of 1912) it would be necessary to increase the force and handle an additional volume of traffic, representing a gross annual increase of \$4,377,195."

"The employees making the present demands are the best paid, as a class, of any on the Erie Railroad. They received a substantial increase in 1910. It was followed by similar demands on the part of other railroad employees. The orbit has been completed, and the present demand is the beginning of a new cycle. It has frankly been stated that if the conductors and trainmen receive the increase asked for, all the other organizations will promptly follow."

"A passenger conductor who has a regular run between Jersey City and Buffalo receives \$213.70 per month, while under

the proposed arrangement he will receive \$258.22 a month, or an increase of 20.8 per cent.

"A passenger brakeman running on the same train now receives \$121.98 for twenty-one days' service per month, and under the new arrangement will receive \$154.96, or an increase of 27 per cent., with no increased duties.

"The New York state law, effective September 1, 1913, stipulates that an additional brakeman, known as a 'full crew' brakeman, for whom the railroad officers can find no occupation, must be placed on certain trains. His rate will be the same as the brakemen cited; so that the present wage demand contemplates an increase of 27 per cent. to a 'full crew' brakeman who has not yet been placed in service, or whose real value has never been developed.

"While this company is willing to consider the wages or conditions of individuals, it will not agree to a general increase to any class of employees until safety appliances, such as block signals, steel cars and greater facilities, have been provided and the net earnings justify further wage increases. If this demand and those which will follow are to be conceded as they have been in the past, the officials of the Erie company, who are held responsible both by the public and the owners, cannot be expected to join in its spoliation; therefore, we have to decline a further participation in the proceedings under the present conditions."

The arbitration bill recently introduced in Congress has passed the Senate and is now in the hands of a House Committee, with certain changes proposed by Secretary Wilson of the Department of Labor. The Senate or "Newlands Bill" provides for an independent bureau of mediation, with a chief mediator at a salary of \$7,500, appointed for a term of seven years. This the railroads and brotherhoods contend is necessary to remove the office from any possible political bias and, at the same time, provide for the appointment of a man whose whole time shall be devoted to this work and whose qualifications for this particular kind of work shall alone be considered by the President in making the appointment; whereas, under the present law, the conciliators are men whose principal work is not industrial mediation but something else. Secretary Wilson's contention is that, as the conciliation feature of the Erdman act has worked well heretofore, it should remain as it is, but that the other amendments urged by the railroads and the brotherhoods should be made.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York. Annual meeting, October 14-15, Philadelphia, Pa.
 AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.
 AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.
 AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
 AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 19, 1913, Chicago.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Chicago. Convention, October 21-24, 1913, Montreal.
 AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.
 AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 22-24, Chicago.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
 AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
 AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.
 ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 18-24, Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y. Annual meeting, October 8, Philadelphia, Pa.
 BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—H. A. Neally, Joseph Dixon Crucible Co., Jersey City, N. J. Meeting with American Railway Bridge and Building Association.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.
 CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.
 CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.
 ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.
 GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 15-18, Chicago.
 INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Annual meeting, August 18, Richmond, Va.
 MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa.
 MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.
 MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Annual meeting, September 9-12, Ottawa, Can.
 NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.
 NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
 NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. & St. P., Duluth, Minn.; 4th Saturday, Duluth.
 PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.
 RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
 RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, second week in December, 1913, New York.
 RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
 RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.
 RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo. Next meeting, August 12-15, Nashville, Tenn.
 RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Convention, October 14, Nashville, Tenn.
 RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
 RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.
 RAILWAY TEL. AND TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.
 RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Convention, September 8-12, 1913, Chicago.
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
 SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.
 SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.
 TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.
 TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meeting with Roadmasters' and Maintenance of Way Association.
 TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.
 TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.
 TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.
 TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.
 TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago.
 TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.
 TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, August, 1913, Chicago.
 UTAH SOCIETY OF ENGINEERS.—R. B. Ketchum, University of Utah, Salt Lake City, Utah; 3d Friday of each month, except July and August.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
 WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The two-cent passenger fare became effective on the principal Missouri lines on July 1. The freight rates fixed by the state law will go into effect on July 15.

The railways of Canada announce that free cartage of freight, which is, furnished by the railways at numerous towns in Canada, will on October 1 be abolished. The contractors who do this carting demand increased compensation, on the renewal of their contracts, and the railroad companies think it is time to abolish this expense.

The Texas Demurrage and Storage Bureau, with headquarters at Houston, went out of existence at the end of June, and all Texas railroads are to handle their demurrage accounts with their individual forces, except at Galveston, where the seven lines, whose terminals are at Galveston, Texas City and Port Bolivar, will continue to co-operate.

The Mississippi River & Bonne Terre has filed an application with the Missouri Public Utilities Commission for permission to retain the three-cent passenger fare, stating that a rate lower than three cents a mile would be confiscatory, as to that road. The company was not a party to the injunction suit against the state two-cent fare law.

The Oklahoma railways in agreeing to establish two-cent fares in the state during the first week in July, without awaiting the final settlement of the litigation of the state passenger fare and freight rate laws, have stipulated with the attorney general of the state that a trial on the merits of the case is not to be held before January 1, 1914, except upon agreement of both sides.

The special circular issued by F. A. Leland for the southwestern lines giving a price list for tariffs in accordance with the recent circular of the Interstate Commerce Commission, has been modified by supplement No. 1, which postpones the effective date from July 1 to October 1, in order to give the public additional time in which to advise of the numbers of tariffs desired to be kept on file after that date.

The number of freight cars moved over the Middle division of the Pennsylvania in the month of June was 217,301 as against 210,181 in the heaviest previous month, which was June, 1907. About half of these cars were loaded, and the average load was no doubt much heavier than in 1907 because of the abandonment of large numbers of small capacity cars during the past six years. The number of loaded cars passing Denholm during the month was 106,928 as compared with 99,606 in June, 1912.

Chairman Clark of the Interstate Commerce Commission held a meeting with officers of the Minnesota railways on July 1, and informed them that since the Minnesota rate case has been settled by the Supreme Court the commission will expect and require the roads to adjust their interstate rates so that they will not be higher than the combination of state or intermediate rates. The passenger officers of the Minnesota roads have announced that with the introduction of two-cent fares excursion rates will be abolished.

Crop Conditions.

The Department of Agriculture estimates crop conditions to be as follows:

States.	Area, 1913. Preliminary Estimate.		Condition.			
	Per cent. compared with 1912.	Acres.	June 25, 1913.	May 25, 1913.	June 25, 1912.	10-yr. av.
Virginia	106	50,000	81	83	87	84
North Carolina	100	1,560,000	76	76	83	81
South Carolina	100	2,716,000	73	68	79	80
Georgia	99	5,336,000	74	69	72	81
Florida	94	230,000	85	83	76	85
Alabama	101	3,804,000	79	75	76	79
Mississippi	102	3,045,000	82	81	74	78
Louisiana	120	1,166,000	81	81	74	78
Texas	103	11,732,000	86	84	89	81
Arkansas	103	2,117,000	86	85	77	80
Tennessee	103	823,000	87	87	76	82
Missouri	106	113,000	88	90	75	82
Oklahoma	107	2,916,000	89	87	82	80
California	155	14,000	95	96	98	..
United States	102.5	35,622,000	81.8	79.1	80.4	80.2

Traffic Club of New York.

The annual outing and clam bake of the Traffic Club of New York will be held at Witzel's Grove, College Point, Long Island, on July 19. The steamer *Adonis* has been chartered for the occasion and will leave the Central Railroad of New Jersey's pier No. 10, North river, at the foot of Cedar street at 10 a. m. No stops will be made on the going trip on the East river as formerly. There will be athletic events, including a baseball game between the representatives of the industrial and transportation interests, and arrangements have been made for a clay pigeon shoot which will be open to all. The clam bake will be served about 2:30 p. m., after which the steamer will proceed for a short sail up Long Island Sound, arriving at New York about 7 p. m.

INTERSTATE COMMERCE COMMISSION.

The commission has further suspended from June 28 until December 27, certain tariffs, which contain advanced switching charges affecting all kinds of freight, in carloads, at Detroit, Mich.

The commission has suspended from June 28 until December 28, the schedules in certain tariffs, which provide for the discontinuance of free store-door delivery and pick-up service performed in connection with shipments of freight by the Baltimore & Ohio and the Pennsylvania Railroad at Washington, D. C.

The commission has further suspended until January 8, 1914, the schedules in 220 tariffs and supplements to tariffs filed by carriers operating in Central Freight Association territory, which would advance rates for the transportation of grain and grain products from points north of the Ohio river and east of the Mississippi river to interstate points.

The commission has further suspended from July 5 until January 5 the schedules in supplements to the tariff of the Chicago, Rock Island & Pacific, which proposed to cancel the through rates now in effect and applicable to the transportation of grain and grain products, c. l., from points in Chicago, St. Louis and Mississippi river rate territory to stations located on the Fort Smith & Western in Oklahoma.

The commission has suspended from July 1 until October 29, certain tariffs, which proposed to effect increases amounting to from 1 to 3 cents per 100 lbs. in commodity rates applicable to the transportation of kainit, hartsalz, muriate of potash, sulphate of potash, manure salts, double manure salts and sylvanite, c. l., from Baltimore, Md., and other eastern points to Cincinnati, Ohio, and other points in Central Freight Association territory.

The commission has further suspended from July 12 until January 12 the schedules in supplements to Agent L. A. Lowrey's tariff, which proposed by the suspended schedules to cancel the absorption by the Erie and certain other carriers entering Chicago of lighterage and floatage charges of 3 cents per 100 lbs. on carload and 5 cents per 100 lbs. on less than carload traffic handled by the Chicago River & Indiana lighterage and float service to and from points on the Chicago river front.

The commission has suspended from July 1 until October 29, the item of a supplement to Agent W. H. Hosmer's tariff, which proposed to cancel the application of third class rating for the transportation of stave, splint and stave rattan baskets, c. l., from points east of the Missouri river to certain points west thereof. The Western classification classifies baskets, c. l., second class, but, by an exception to said classification filed by carriers, third class rating is now applied on such traffic in this territory.

The commission has suspended until October 29, the schedules in certain tariffs which would increase rates on flaxseed originating beyond Minneapolis, Minn., and points taking Minneapolis rates to Fredonia, Kan., Kansas City and other Missouri river points. The present rate from Minneapolis to Fredonia is 15 cents per 100 lbs., and the proposed rate is 26½ cents per 100 lbs. The present rate to Kansas City is 10½ cents, and the proposed rate is 16½ cents per 100 lbs. Rates to the other points involved are similarly increased.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF MAY, 1913.

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) last year.		
		Freight.	Passenger.	Total.	Way and structures, equipment.	Traffic.	Trans- portation.						General.	Total.
Alabama & Vicksburg.....	143	\$100,829	\$43,651	\$155,490	\$22,034	\$39,584	\$4,015	\$52,687	\$123,869	\$31,621	—\$391	\$5,300	\$25,930	\$23,356
Alabama Great Southern.....	309	317,994	116,142	471,540	57,015	117,879	12,176	167,473	365,259	106,281	—575	14,477	91,229	1,348
Arizona Eastern.....	367	190,622	41,281	245,851	55,862	30,147	2,624	58,999	155,219	90,632	82	11,800	78,914	—2,626
Atchison, Topeka & Santa Fe.....	8,238	5,285,517	2,049,408	7,954,210	1,029,819	1,333,112	169,574	2,288,266	183,282	5,004,053	2,950,157	342,497	2,607,660	—282,392
Atlanta & West Point.....	93	46,687	38,910	85,597	95,229	20,560	5,344	36,629	78,624	16,605	2,042	6,344	12,303	5,451
Atlanta, Birmingham & Atlantic.....	645	173,456	53,873	247,113	43,472	43,438	14,694	104,526	216,765	30,348	.....	14,337	16,011	16,177
Atlantic & St. Lawrence.....	167	65,000	20,750	93,160	35,053	18,997	3,636	70,455	27,888	37,769	.....	16,152	53,921	—73,369
Atlantic City.....	167	61,615	125,374	195,025	44,219	13,611	2,637	86,938	148,570	46,455	.....	9,000	33,584	—4,664
Atlantic Coast Line.....	4,615	2,030,585	653,157	2,924,072	417,512	505,154	47,953	1,147,975	82,587	2,201,581	—3,871	112,000	610,491	—108,335
Baltimore & Ohio—System.....	4,455	7,138,546	1,308,905	8,967,456	1,147,666	1,523,242	178,618	3,217,700	6,291,475	2,675,981	—62,247	211,763	2,401,971	—10,109
Baltimore & Ohio Chicago Terminal.....	77	.....	1,841	163,366	18,560	20,754	782	72,836	117,671	45,695	1,014	16,052	30,657	28,716
Bangor & Aroostook.....	631	239,801	47,242	300,279	36,555	38,211	2,484	87,604	180,637	119,642	6	8,060	111,588	25,254
Belt Ry. Co. of Chicago.....	21	.....	.....	269,343	17,079	42,739	573	101,400	167,519	101,824	.....	9,815	92,009	15,641
Boston & Maine.....	2,244	2,390,962	1,281,458	3,973,644	510,210	714,597	37,034	1,818,636	102,844	3,183,321	17,831	166,221	641,933	—416,871
Buffalo & Susquehanna R. R.....	265	146,400	7,946	158,889	27,665	23,417	1,131	54,909	113,058	45,831	.....	2,200	43,631	23,869
Buffalo & Susquehanna Ry.....	91	40,724	7,999	48,723	13,554	28,778	432	22,797	69,019	17,683	—92	1,700	19,475	924
Butte, Anaconda & Pacific.....	90	104,004	11,005	125,203	10,579	19,043	661	50,913	83,923	41,280	.....	2,000	39,280	35,483
Canadian Pacific Lines in Maine.....	233	58,536	32,224	90,760	38,163	16,712	7,429	57,368	124,106	25,518	.....	12,000	37,518	36,421
Carolina, Clinchfield & Ohio.....	247	208,255	16,365	229,575	17,206	20,893	7,945	39,300	96,594	132,981	.....	8,000	124,981	9,044
Carolina, Clinchfield & Ohio Ry. Co. of S. C.....	18	8,775	1,538	10,583	928	83	1,457	2,987	5,913	4,670	.....	500	4,170	—3,191
Central of Georgia.....	1,915	609,102	294,315	1,003,172	180,229	219,158	35,324	391,824	869,681	133,491	6,240	49,915	89,816	—73,068
Central of New Jersey.....	676	1,738,239	463,244	2,281,483	303,407	365,892	27,698	702,527	1,445,211	837,907	—12,658	122,410	702,839	557,771
Central New England.....	277	259,870	30,508	306,862	64,093	35,201	1,115	67,809	170,941	135,921	32	10,000	125,953	53,063
Central Vermont.....	411	252,397	82,350	358,935	36,490	50,706	8,916	131,696	284,776	104,159	—16	16,927	87,216	—30
Charleston & Western Carolina.....	341	101,768	27,065	128,833	34,532	35,482	3,646	61,579	140,506	3,000	.....	5,000	8,000	—9,391
Chesapeake & Ohio Lines.....	2,324	2,320,365	487,145	2,807,510	353,293	587,338	51,479	986,541	67,579	2,046,230	3,671	127,155	774,882	1,953
Chicago & Alton.....	1,026	828,969	339,336	1,168,305	228,881	254,738	41,360	491,185	297,707	1,045,817	6,044	45,200	155,575	—92,255
Chicago, Burlington & Quincy.....	9,129	4,975,889	1,681,536	6,657,425	1,906,708	1,327,043	131,467	2,315,625	205,989	5,886,832	5,965	278,987	1,123,776	12,242
Chicago, Burlington & Quincy.....	9,129	4,975,889	1,681,536	6,657,425	1,906,708	1,327,043	131,467	2,315,625	205,989	5,886,832	5,965	278,987	1,123,776	12,242
Chicago, Indiana & Southern.....	359	351,939	25,068	390,241	32,482	100,788	8,556	127,468	302,230	88,011	617	15,282	73,346	55,510
Chicago, Indianapolis & Louisville.....	617	442,381	148,425	590,806	93,378	95,155	18,441	234,402	355,243	190,350	.....	28,578	161,772	76,350
Chicago Junction.....	12	.....	180,055	180,055	15,965	12,947	983	84,809	117,778	62,227	.....	406	61,871	24,716
Chicago, Milwaukee & St. Paul.....	9,592	5,271,966	1,437,088	6,709,054	1,075,111	1,148,287	165,994	2,650,881	174,167	5,214,440	10,007	328,700	1,804,898	588,378
Chicago, Peoria & St. Louis.....	255	97,562	25,165	122,727	19,644	30,885	6,872	59,376	121,968	8,595	.....	4,640	3,555	10,685
Chicago, Rock Island & Pacific.....	7,566	3,322,680	1,445,124	4,767,804	576,139	780,676	185,186	2,021,263	3,804,073	1,400,638	—18,207	237,393	985,038	—2,632
Chicago, St. Paul, Minneapolis & Omaha.....	1,744	838,115	358,941	1,197,056	216,822	180,738	28,450	495,428	935,944	336,881	1,044	66,272	271,653	—93,023
Chicago, Terre Haute & Southeastern.....	351	131,677	17,510	149,187	37,815	51,265	2,761	51,445	79,772	174,3	—256	10,000	8,513	—2,164
Cincinnati, New Orleans & Texas Pacific.....	337	787,994	149,034	937,028	98,035	240,621	28,058	280,528	19,435	663,380	315,917	480	286,437	1,192
Cleveland, Cincinnati, Chic. & St. Louis.....	2,014	2,015,810	674,043	2,920,459	531,444	747,278	85,372	1,232,442	60,816	2,657,352	1,137	103,800	158,170	—207,209
Colorado Midland.....	338	89,607	20,192	109,799	32,154	31,877	8,968	59,492	138,569	263,183	1,551	8,000	27,734	—27,897
Colorado & Southern.....	1,069	622,385	105,896	728,281	119,699	176,707	11,496	213,434	21,945	543,281	3,938	29,175	189,342	50,319
Detroit & Mackinac.....	411	77,502	24,863	102,365	11,873	15,082	1,918	36,070	67,592	40,491	—1,070	8,379	31,042	17,635
Detroit & Toledo Shore Line.....	79	120,451	47,000	167,451	12,730	12,730	1,279	29,145	53,200	67,822	.....	5,945	61,877	305
Detroit, Grand Haven & Milwaukee.....	191	124,000	47,000	171,000	36,527	36,527	5,670	131,246	214,781	16,869	74	2,953	19,748	—40,999
Detroit River Tunnel.....	2	.....	110,158	110,158	2,324	2,324	.....	9,145	14,936	95,214	.....	6,000	89,214	6,733
Detroit, Toledo & Ironton.....	441	127,560	10,582	138,142	33,114	59,948	2,832	88,567	190,016	38,918	.....	5,935	44,853	11,144
Duluth & Iron Range.....	272	924,409	22,736	947,145	96,155	51,159	1,039	98,583	10,321	357,257	4,491	48,124	553,699	85,767
Duluth, Missabe & Northern.....	356	1,276,094	34,554	1,310,648	110,061	104,708	1,899	212,059	12,465	876,505	2,679	66,254	812,930	206,784
Duluth, South Shore & Atlantic.....	627	201,345	84,404	285,749	82,974	37,529	12,980	120,916	9,986	264,385	59	18,000	26,625	10,895
El Paso & Southwestern Co.....	982	611,418	104,334	715,752	102,246	110,490	16,293	225,110	29,743	483,882	—13,266	35,000	213,629	—46,582
Elgin, Joliet & Eastern.....	822	1,131,449	7	1,131,456	139,675	189,286	5,817	326,602	17,358	678,738	.....	50,420	479,096	—36,779
Florida East Coast.....	642	261,145	120,472	439,415	65,269	70,237	6,597	173,616	12,142	327,861	—127	18,500	72,927	—30,593
Fort Worth & Denver City.....	454	292,743	425,936	718,679	57,292	79,031	8,286	161,208	13,993	319,810	—1,285	9,086	95,755	8,404
Galveston, Harrisburg & San Antonio.....	1,338	654,595	241,302	895,897	134,839	159,173	34,847	429,455	29,687	788,001	3,669	28,590	147,187	—3,001
Georgia.....	307	173,204	71,858	245,062	31,325	50,396	11,786	131,699	23,313	29,488	.....	2,871	26,617	29,074
Grand Rapids & Indiana.....	578	281,584	124,020	405,604	82,936	88,007	9,816	186,861	16,602	384,222	3,268	23,641	41,795	10,623
Grand Trunk Western.....	347	415,000	181,000	596,000	48,066	97,418	23,556	310,937	15,382	495,359	—3,881	29,877	106,279	—3,998
Great Northern.....	7,756	5,344,069	1,247,118	6,591,										

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF MAY, 1913.—(CONTINUED).

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equipment.	Traffic.	Trans- portation.	General.					
Louisiana & Arkansas	255	\$124,623	\$20,309	\$144,932	\$25,548	\$22,966	\$2,428	\$6,243	\$5,210	\$92,395	\$56,971	\$4,167	\$52,804	\$1,080
Louisiana Ry. & Navigation	351	117,058	22,018	149,076	29,375	26,373	6,004	58,490	5,325	126,167	33,062	4,500	18,562	8,035
Louisville & Nashville	4,919	3,720,274	1,036,491	4,756,765	1,214,956	1,017,537	107,484	1,732,646	120,042	4,192,665	878,715	159,242	719,428	299,373
Maine Central	1,206	615,943	267,032	882,975	186,398	162,233	8,572	368,807	25,891	751,901	137,084	47,291	134,167	31,109
Michigan Central	1,817	1,954,124	731,310	2,685,434	375,513	416,582	70,306	1,191,962	53,555	2,107,918	877,005	2,545	763,550	221,353
Minneapolis & St. Louis	1,586	516,951	138,803	655,754	109,741	83,215	18,044	291,942	19,930	522,872	179,406	32,442	146,961	26,165
Minneapolis, St. Paul & Sault Ste. Marie	3,976	1,835,500	470,173	2,305,673	401,623	359,893	60,971	848,578	59,034	1,730,119	723,084	17,119	576,785	100,988
Missouri, Kansas & Texas System	3,817	1,493,827	744,181	2,238,008	387,804	292,706	65,181	1,003,724	96,140	1,845,555	504,072	1,087	458,967	82,078
Missouri Pacific	3,920	1,719,267	415,401	2,134,668	253,010	365,080	62,812	909,991	63,454	1,654,317	666,510	3,672	576,238	294,493
Mobile & Ohio	1,114	1,011,591	117,883	1,129,474	111,968	240,013	41,806	434,878	33,851	862,516	324,469	1,402	291,004	54,240
Monongahela	65	140,916	2,833	143,749	26,007	6,716	507	25,900	2,127	61,257	84,794	3,000	81,794	12,170
Nashville, Chattanooga & St. Louis	1,231	792,951	266,069	1,059,020	180,817	199,021	43,955	436,150	27,698	887,641	249,794	209	223,893	1,299
Nevada Northern	165	132,711	12,887	145,598	18,300	17,898	308	30,191	5,265	71,962	77,060	6,551	70,509	3,125
New Orleans & North Eastern	196	262,373	53,665	316,038	32,410	60,503	10,911	127,770	11,913	243,507	95,448	77	83,675	22,648
New Orleans Great Northern	283	131,789	31,814	163,603	24,566	17,742	2,666	48,614	6,993	100,281	73,552	2,334	73,552	20,038
New Orleans, Texas & Mexico	286	91,897	5,830	97,727	45,226	25,233	3,599	49,984	6,440	130,482	23,178	1,479	24,657	31,762
New York Central & Hudson River	3,750	6,135,200	2,897,679	9,032,879	1,447,882	1,889,411	198,824	3,537,771	240,599	7,314,487	2,711,234	44,482	2,218,487	535,901
New York, Chicago & St. Louis	564	824,901	128,165	953,066	98,808	160,702	46,239	434,550	17,545	808,319	178,489	4,200	142,289	84,378
New York, New Haven & Hartford	2,091	2,976,450	2,231,452	5,207,902	838,715	915,251	40,351	2,481,755	182,620	4,438,692	1,261,514	308,000	952,079	566,175
New York, Ontario & Western	566	627,289	128,698	755,987	101,194	131,678	12,399	287,622	14,122	547,015	267,902	22,500	223,719	248,343
New York, Philadelphia & Norfolk	112	294,439	37,786	332,225	32,148	58,496	4,585	158,322	13,342	266,893	89,562	8,000	81,562	10,582
Norfolk & Western	2034	3,401,368	382,422	3,783,790	470,161	810,236	64,339	1,210,976	66,153	2,621,865	1,279,703	122,200	1,156,872	5,800
Norfolk Southern	562	171,496	64,816	236,312	21,889	37,988	6,219	89,222	10,829	166,147	89,295	4,811	84,002	15,832
Norfolk Northern	472	864,452	238,015	1,102,467	156,757	288,363	16,578	531,517	25,504	1,018,719	156,675	40,475	116,464	106,915
Northern Pacific	6,314	4,098,478	1,299,939	5,398,417	1,314,413	674,482	139,164	1,905,186	85,357	4,118,602	1,647,815	352,693	1,299,038	137,614
Northwestern Pacific	401	116,923	187,866	304,789	47,467	116,156	4,916	116,156	11,497	231,212	97,019	13,050	83,969	27,481
Oregon Short Line	1,942	1,161,830	392,588	1,554,418	300,217	193,197	34,360	440,559	48,841	1,017,184	643,759	1,906	536,954	189,231
Oregon-Washington R. R. & Nav. Co.	1,914	949,209	426,746	1,375,955	147,774	243,977	54,193	531,731	54,968	1,052,356	425,386	108,002	309,524	61,100
Peoria & Eastern	352	211,456	61,806	273,262	60,875	55,209	5,185	119,389	6,002	246,660	45,281	10,400	34,881	19,056
Pennsylvania Co.	1,751	4,887,536	809,660	5,697,196	1,127,171	1,134,675	88,913	2,162,099	111,326	4,624,184	1,604,645	252,653	1,346,647	37,288
Pennsylvania Railroad	4,025	11,500,858	3,072,684	15,573,542	1,998,359	3,326,479	210,654	5,500,991	363,264	11,389,747	4,214,181	585,023	3,494,309	35,273
Pecos & Northern Texas	482	152,995	40,060	193,055	23,643	42,863	3,497	70,013	6,822	146,838	56,718	6,325	50,393	12,735
Pere Marquette	2,330	1,009,691	282,611	1,292,302	308,518	240,763	30,294	531,584	37,270	1,168,429	267,323	31,711	208,533	47,725
Philadelphia & Reading	1,015	3,403,725	627,523	4,031,248	472,933	768,058	40,771	1,301,673	59,645	2,643,080	1,601,999	63,661	1,579,263	793,816
Philadelphia, Baltimore & Washington	713	933,506	721,148	1,654,654	387,629	331,629	39,227	794,303	39,940	1,582,302	268,926	53,477	215,449	77,566
Pittsburgh & Lake Erie	223	1,669,870	144,513	1,814,383	172,020	278,757	14,214	397,974	27,757	890,722	994,513	55,200	938,810	301,603
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	2,832,635	735,425	3,568,060	907,688	755,880	70,184	1,501,808	78,836	3,314,396	670,614	141,649	528,480	183,720
Pittsburgh, Shawmut & Northern	279	158,621	8,890	167,511	41,268	40,374	1,189	56,087	5,457	144,375	26,703	1,610	25,093	17,230
Port Reading	21	131,252	.....	131,252	11,876	25	32	34,061	134	46,128	87,965	8,000	89,565	34,125
Richmond, Fredericksburg & Potomac	88	165,812	80,380	246,192	32,306	24,732	3,366	90,718	7,240	158,362	123,056	950	121,691	5,611
Rutland	468	192,179	93,188	285,367	40,005	69,124	8,047	125,761	8,402	251,339	75,960	17,608	58,352	14,840
St. Joseph & Grand Island	319	82,064	28,185	110,249	40,408	24,849	5,051	54,236	6,315	130,859	47,795	6,244	13,905	6,112
St. Louis, Brownsville & Mexico	518	188,843	76,480	265,323	43,656	35,078	4,735	138,216	9,171	230,856	51,426	5,500	45,926	11,819
St. Louis, Iron Mountain & Southern	3,365	2,102,287	492,780	2,595,067	355,434	401,892	60,913	843,101	81,756	1,743,096	1,041,764	127,125	910,396	3,417
St. Louis Merchants' Bridge Terminal	9	.....	399	399	158,483	34,938	687	82,652	5,446	134,179	24,304	5,768	18,536	7,797
St. Louis Southwestern	906	553,063	116,879	669,942	83,984	119,444	28,971	163,715	25,669	421,783	292,557	37,602	253,123	2,806
St. Louis Southwestern of Texas	703	214,554	77,987	292,541	88,335	94,148	12,390	162,131	19,653	376,657	60,736	11,228	71,924	37,867
San Antonio & Arkansas Pass	727	252,385	109,177	361,562	80,825	92,141	6,511	182,152	12,022	351,631	29,194	12,000	17,194	18,958
San Antonio & San Antonio Pass	1,035	553,284	244,255	797,539	860,324	123,465	32,176	294,838	19,031	595,593	264,731	43,900	217,613	52,122
Seaboard	3,182	1,456,419	390,504	1,846,923	2,076,750	193,500	72,113	751,407	59,180	1,359,900	716,850	77,000	637,100	164,273
Southern in Mississippi	281	39,975	26,789	66,764	28,550	13,781	3,323	41,647	4,062	91,363	18,661	8,191	26,852	1,590
Southern	7,037	3,641,584	5,605,709	9,247,293	829,197	1,115,760	181,825	2,021,328	160,892	4,309,002	1,296,707	205,737	1,102,117	204,005
Southern Pacific Co.	6,329	4,549,337	2,634,933	7,184,270	834,331	1,084,960	211,775	4,508,491	211,775	4,508,316	3,394,491	348,610	3,188,452	340,493
Tennessee Central	294	104,151	36,001	140,152	29,603	15,515	5,515	48,139	6,992	105,403	44,687	4,264	40,423	6,356
Terminal R. Assn. of St. Louis	34	.....	298	298	244,954	33,273	941	94,959	4,581	150,821	94,132	25,560	73,139	30,804
Texas & Pacific	1,885	922,225	343,816	1,266,041	242,974									

REVENUES AND EXPENSES OF RAILWAYS.

ELEVEN MONTHS OF FISCAL YEAR, 1913.

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) last year.			
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equipment.	Traffic.						Trans- portation.	General.	Total.
Alabama & Vicksburg.....	143	\$1,149,756	\$602,906	\$1,752,662	\$262,565	\$329,601	\$39,891	\$592,310	\$61,532	\$1,285,899	\$431,169	-\$2,268	\$64,286	\$364,615	\$97,703
Alabama Great Southern.....	309	3,420,614	1,178,053	4,598,667	573,792	1,083,400	140,863	1,572,765	109,346	1,480,168	1,325,024	-6,528	160,741	1,157,755	21,995
Arizona Eastern.....	367	1,910,570	426,583	2,337,153	327,775	204,888	28,623	620,351	92,591	1,274,228	1,194,596	944	104,193	1,091,398	340,297
Atchison, Topeka & Santa Fe.....	8,238	59,878,130	23,370,913	83,249,043	14,219,779	15,073,392	1,888,136	26,034,256	1,818,026	59,033,589	31,721,987	3,741,593	27,980,394	1,977,778	-39,093
Atlanta & West Point.....	93	589,185	447,516	1,036,701	139,112	212,203	58,715	378,602	54,238	842,870	304,873	3,490	69,784	238,579	-108,512
Atlanta, Birmingham & Atlantic.....	645	2,197,873	602,906	2,800,779	486,875	478,944	168,163	1,200,807	125,295	2,460,804	550,378	.....	149,899	400,479	13,817
Atlantic & St. Lawrence.....	167	1,154,890	1,312,578	2,467,468	281,909	237,632	49,292	842,472	42,239	1,453,544	148,079	.....	133,482	400,479	83,125
Atlantic City.....	167	698,638	1,150,501	1,849,139	347,261	162,958	26,535	1,011,051	14,723	1,565,452	392,103	-35,957	90,000	257,206	381,692
Atlantic Coast Line.....	4,615	22,738,350	8,299,245	31,037,595	3,513,818	4,423,296	566,335	11,788,382	856,141	22,701,759	10,812,059	.....	1,404,090	9,507,969	219,697
Baltimore & Ohio-System.....	4,455	73,167,544	14,079,050	87,246,594	12,408,001	16,841,478	1,836,484	34,072,479	1,906,056	67,064,498	25,472,931	-782,220	2,725,931	21,968,056	-299,671
Baltimore & Ohio Terminal.....	77	21,633	1,644,330	1,665,963	209,151	257,560	8,411	767,613	51,875	1,294,610	349,720	9,747	193,130	166,337	97,947
Bangor & Aroostook.....	631	2,252,741	570,227	2,822,968	482,206	386,998	34,993	1,042,729	141,709	2,088,636	894,129	-1,329	113,060	779,740	264,384
Belt Ry. Co. of Chicago.....	21	26,385,057	14,675,541	41,060,598	173,251	400,718	5,541	1,231,865	59,709	1,871,084	1,062,872	165,160	90,259	972,613	104,961
Boston & Maine.....	2,244	1,546,079	91,413	1,637,492	5,273,951	7,137,900	384,140	21,299,970	1,123,391	35,219,252	9,245,601	.....	1,956,940	745,821	730,879
Buffalo & Susquehanna R.....	265	460,566	100,439	561,005	128,922	308,574	5,136	251,749	29,652	724,033	135,697	9	17,500	153,188	17,528
Buffalo & Susquehanna Ry.....	90	990,961	120,472	1,111,433	140,263	239,425	7,803	585,334	32,467	1,005,292	214,628	.....	22,638	191,990	14,597
Butte, Anaconda & Pacific.....	233	942,161	351,552	1,293,713	1,402,434	206,860	67,402	602,359	53,808	1,241,090	1,611,544	.....	112,000	48,774	68,375
Canadian Pacific Lines in Maine.....	247	2,057,872	166,153	2,224,025	158,609	231,604	75,867	395,899	93,599	578,066	1,816,504	.....	88,000	1,228,504	232,481
Carolina, Clinchfield & Ohio.....	181	123,969	17,656	141,625	9,899	95,999	12,173	29,513	5,256	57,806	86,379	.....	5,500	80,879	8,881
Carolina, Clinch. & Ohio Ry. Co. of S. C.....	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central of Georgia.....	1,915	8,290,621	3,528,906	11,819,527	1,900,572	2,382,478	385,426	4,456,532	432,287	9,557,295	3,401,157	66,264	553,611	2,913,810	369,130
Central of New Jersey.....	676	19,640,586	5,021,419	24,662,005	2,458,412	2,458,412	321,268	7,784,354	474,978	14,915,197	11,083,325	-72,661	1,361,211	9,649,453	490,374
Central New England.....	277	2,914,656	329,906	3,244,562	491,683	324,645	12,981	922,788	38,597	1,790,694	1,620,950	4,648	110,000	1,506,302	64,430
Central Vermont.....	411	2,528,137	1,000,333	3,528,470	427,690	663,324	90,528	1,885,811	90,885	3,158,238	666,718	520	156,253	510,985	135,795
Charleston & Western Carolina.....	341	1,343,841	329,529	1,673,370	324,621	286,926	36,643	678,964	52,314	1,379,468	383,856	.....	55,000	328,856	-39,317
Chesapeake & Ohio Lines.....	2,324	25,235,700	5,323,359	30,559,059	3,812,537	6,903,249	610,132	10,409,264	720,233	22,455,415	9,569,366	32,912	1,248,705	8,353,573	1,224,166
Chicago & Alton.....	1,026	9,131,733	3,846,783	12,978,516	2,323,639	3,239,289	480,127	5,365,427	367,902	11,685,384	21,323,33	30,659	443,300	1,842,274	1,030,329
Chicago, Burlington & Quincy.....	9,129	59,107,397	20,024,322	79,131,719	8,678,698	11,011,235	1,427,275	27,598,205	2,352,356	57,057,650	29,821,048	-127,613	3,110,018	26,583,417	3,769,428
Chicago, Indiana & Southern.....	359	3,634,615	279,067	3,913,682	4,066,921	5,125,122	1,015,890	1,395,790	110,786	3,137,888	929,533	4,382	180,119	753,796	330,868
Chicago, Indianapolis & Louisville.....	617	4,310,625	1,510,613	5,821,238	974,799	896,149	198,247	2,432,868	161,642	4,663,705	1,759,600	.....	265,460	1,494,140	137,069
Chicago Junction.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Milwaukee & St. Paul.....	9,592	62,758,708	16,671,685	79,430,393	188,955	120,089	12,359	890,618	40,418	1,252,439	577,863	187	95,099	271,068	45,927
Chicago, Peoria & St. Louis.....	255	486,269	111,164	597,433	637,566	93,884	129,555	34,784	328,967	618,167	19,399	.....	21,840	583,472	45,772
Chicago, Rock Island & Pacific.....	7,566	40,589,063	17,412,593	57,991,656	9,388,4	129,555	34,784	328,967	618,167	19,399	.....	.....	21,840	583,472	45,772
Chicago, St. Paul, Minneapolis & Omaha.....	1,744	10,029,270	4,550,704	14,580,000	8,654,148	8,944,905	1,716,843	25,393,686	1,545,516	46,255,098	15,480,387	-180,962	2,619,732	12,779,693	1,159,295
Chicago, Terre Haute & Southeastern.....	351	1,548,534	194,546	1,743,080	307,283	382,383	34,018	578,131	86,144	1,388,726	397,995	2,641	110,000	285,354	126,216
Cincinnati, New Orleans & Texas Pacific.....	337	2,401,459	1,692,615	4,094,074	926,226	2,225,620	255,751	2,782,304	213,464	6,403,353	3,206,448	7,753	316,000	2,882,029	119,213
Cleveland, Cincinnati, Chic. & St. Louis.....	2,014	21,300,559	7,183,943	28,484,499	6,188,336	6,188,336	798,837	12,445,238	635,661	24,329,122	6,765,234	-16,292	1,139,243	5,609,699	680,820
Colorado Midland.....	338	1,306,872	235,589	1,542,461	238,752	377,980	82,899	758,697	62,429	1,520,757	1,799,887	3,848	93,600	82,435	-92,557
Colorado & Southern.....	1,069	6,356,548	1,269,527	7,626,075	1,059,212	1,836,143	122,258	2,411,425	244,276	5,673,314	2,467,467	-13,402	322,084	2,131,981	68,805
Detroit & Mackinac.....	411	750,553	312,553	1,063,106	152,437	159,713	24,927	406,682	31,262	775,021	366,354	.....	95,099	271,068	45,927
Detroit & Toledo Shore Line.....	79	1,224,273	585,784	1,810,057	133,822	68,352	13,491	343,189	25,912	584,766	644,281	.....	60,809	583,472	45,772
Detroit, Grand Haven & Milwaukee.....	191	1,382,997	585,784	1,968,781	516,246	327,955	74,592	1,228,473	54,677	2,201,943	78,510	-510	32,484	45,516	-241,843
Detroit, River Tunnel.....	2	.....	.....	.....	24,748	31,413	.....	97,780	918	134,859	1,033,929	.....	55,508	968,421	-54,866
Detroit, Toledo & Ironton.....	441	1,278,792	138,632	1,417,424	379,089	368,828	29,281	784,137	58,584	1,619,919	-84,040	.....	62,935	-146,986	-243,221
Duluth & Iron Range.....	272	5,729,473	239,346	5,968,819	608,950	766,298	10,515	1,398,213	132,963	2,919,584	3,149,366	15,811	297,075	2,868,102	61,083
Duluth, Missabe & Northern.....	356	6,755,764	400,684	7,156,448	841,054	879,606	22,444	1,480,613	3,366,474	3,869,292	17,896	350,295	3,536,263	537,166	105,179
Duluth, South Shore & Atlantic.....	627	2,031,650	875,736	2,907,386	633,570	373,072	107,399	1,243,254	109,640	2,466,935	603,255	3,213	197,914	408,554	-105,179
El Paso & Southwestern Co.....	982	6,575,526	1,041,668	7,617,194	966,833	1,076,851	159,243	2,213,925	292,336	4,709,188	3,256,848	-31,918	343,952	2,880,978	370,029
Elgin, Joliet & Eastern.....	822	11,311,629	129	11,311,758	1,286,958	1,879,827	55,225	3,458,278	194,828	6,875,116	5,326,215	.....	357,043	4,969,172	1,225,842
Florida East Coast.....	642	2,309,517	1,806,947	4,1,											

The commission has suspended from June 25 until December 25, the operation of the supplement to the tariff of the Louisville & Nashville, which would advance rates for the transportation of cottonseed oil, cottonseed foots or tank bottoms, c. l., from points in Georgia and Arkansas to points north of the Ohio river, when refined in transit at Louisville, Ky.

The commission has suspended from July 1 until October 29, the supplement to the tariff of the Missouri, Kansas & Texas, which proposed to cancel proportional commodity rates applicable to the transportation of straw, c. l., from local stations on the Missouri, Kansas & Texas in Missouri, to Alton, Ill., when destined to paper mills at Federal, Ill. The present rates range from 5 cents per 100 lbs. on shipments originating at West Alton, Mo., to 6½ cents per 100 lbs. on shipments originating at North Jefferson, Mo. The advances range from ¾ of one cent to 3 cents per 100 lbs.

Rates on Petroleum Products Reduced.

Milliken Refining Company v. St. Louis & San Francisco, et al. Opinion by Commissioner McChord:

The commission found that the present rates on petroleum asphalt, petroleum road oil, and petroleum tailings from Vinita, Okla., to St. Louis, Mo., and East St. Louis and Granite City, Ill., and on refined petroleum from Vinita, Okla., to Sedalia, Mo., were unreasonable and prescribed reasonable rates for the future. (27 I. C. C., 445.)

Complaint Dismissed.

Consolidated Pump Company v. Lake Shore & Michigan Southern et al. Opinion by the commission:

The complainant asked the commission to require the defendants to furnish a switch at its factory so it could receive and deliver freight from and to the cars of the defendants. The commission decided that the record did not present a state of facts upon which the commission could order the relief sought by complainant. (27 I. C. C., 519.)

Rates on Iron and Steel Reduced.

Vulcan Iron Works Company v. Atchison, Topeka & Santa Fe et al.

The findings in original report, 22 I. C. C., 477, are modified and defendants' rate of 63 cents on iron and steel bars, steel plates, steel sheets, and structural steel, fabricated or unfabricated, to Denver, Col., from St. Louis, Mo., and other Mississippi river crossings taking the same rates, applicable on traffic originating east of the Mississippi river, is found to be unreasonable to the extent it exceeds 45 cents on all these commodities. (27 I. C. C., 468.)

Reparation Awarded.

Western Fruit Jobbers' Association of America v. Chicago, Rock Island & Pacific et al. Opinion by Chairman Clark:

The commission decided that certain advances in rates on grapes in carloads from Chicago, East St. Louis, Ill., and St. Louis, Mo., to various points in Kansas had not been justified, and ordered the former rates restored. An increase in the carload minimum weight from 20,000 lbs. to 24,000 lbs. was approved, and reparation was awarded. (27 I. C. C., 417.)

Weyl-Zuckerman & Company v. Colorado Midland et al. Opinion by the commission:

The complainants shipped three carloads of potatoes from points in Colorado to points in California, routed via the San Pedro, Los Angeles & Salt Lake, which, owing to washouts on the line of that road, were diverted to the Southern Pacific by the initial carrier without instructions from the owner. The commission decided that the initial carrier is liable for the resulting increase in the transportation charges. (27 I. C. C., 493.)

Marian Coal Company v. Delaware, Lackawanna & Western. Opinion by Commissioner Meyer:

Reparation was awarded on account of unreasonable rates charged for the transportation of anthracite coal in carloads from Taylor, Pa., to Hoboken, N. J., and New York Lighterage station, N. J. (i. o. b. vessel), in accordance with the conclusions announced in *Marian Coal Co. v. D. L. & W. R. R. Co.*, 24 I. C. C., 140, mentioned in the *Railway Age Gazette* of June 28,

1912, page 1622; and 25 I. C. C., 14, mentioned in the *Railway Age Gazette* of November 8, 1912, page 901. (27 I. C. C., 441.)

Jersey City, N. J., Discriminated Against.

Allentown Portland Cement Company v. Philadelphia & Reading et al. Opinion by Commissioner Clements:

The defendants' rates on cement in carloads to Baltimore, Philadelphia, New York, points in New England, and to Jersey City for beyond to the Southeast are the same from Evansville, Pa., in the so-called Lehigh district, as from the other cement-producing points in that district. On cement to Jersey City locally their rates are much higher from Evansville than from these other mills. Such relative adjustment on the latter traffic was held to subject Jersey City and its traffic to undue prejudice and disadvantage, and the defendants were ordered to remove this discrimination. (27 I. C. C., 448.)

Reconsignment and Storage of Lumber and Shingles.

In re advances in rates for the transportation of lumber and shingles from North Pacific Coast territory to points in Minnesota, Wisconsin and other states. Opinion by Commissioner Marble:

Carriers serving the territory between the Pacific coast and the Missouri river undertook to cancel provisions in their tariffs by which reconsignment and storage have heretofore been given at Minnesota Transfer, Minn., Aberdeen, S. Dak., and points east thereof, on shipments of lumber and shingles en route from north Pacific coast points to points east of the Missouri river. The commission decided that the proposed cancellation of storage at Minnesota Transfer and Aberdeen should be permitted, but the continuance of reconsignment at those points is required, and the proposed withdrawal of services on connecting lines, contemporaneously granted to other shippers of lumber and shingles, is forbidden. (27 I. C. C., 451.)

New York Suburban Fares.

Suspension of commutation rates between New York and points in Connecticut. Opinion by Commissioner Harlan:

This opinion is supplementary to a former decision dealing with rates from points in New Jersey to New York City. (21 I. C. C., 428.) The fares on the New Haven from Connecticut were then left out of consideration because other fares on the same line were involved in a case pending before the New York state commission. It is now held that the commutation fares of the New York, New Haven & Hartford from points in the state of Connecticut into New York City are not unreasonable, except as to certain stations specifically named in the report. These stations excepted are those from Greenwich to Stamford, inclusive. The report does not give details, but says that from Riverside, 30 miles from New York, the monthly rate, now \$10.30, must not be over \$9.25. This, says the commission, should be the basis of all the rates in this ten mile section—Greenwich to Stamford; it will put the rates on a parity with those from points farther away and with those wholly within New York state. The commission holds that 50-trip family tickets should be issued in Connecticut at rates on a parity with those for tickets of this form issued in New York state. (27 I. C. C., 549.)

Through Export Bills of Lading on Cotton.

Aransas Pass Channel & Dock Company v. Galveston, Harrisburg & San Antonio et al. Opinion by Chairman Clark:

The complainant contends that the defendants refuse to establish rates on cotton from Texas producing points to Port Aransas for export, and that they refuse to issue through export bills of lading on cotton for export through that port, thus extending undue preference and advantage to other ports through which they do issue through export bills of lading. The commission decided that there is a lawful basis of rates to Port Aransas which is higher than to other ports, but that defendants have failed to assess the proper rate as required by the act. No justification is shown for the exaction of any higher rate to Port Aransas than to other Texas ports, and defendants should put Port Aransas on an equality of rates with other Texas ports. The commission has no direct authority to require the issuance of through export bills of lading, but it does have

power to remove discrimination; the issuance of through bills of lading through one Texas port while refusing to issue them on like traffic through another Texas port is unjustly discriminatory and prejudicial against the latter. The defendants were ordered to cease and desist from such discrimination and to observe uniform practices in the issuance of through export bills of lading on cotton. (27 I. C. C., 403.)

Port Arthur, Tex., Not Discriminated Against.

Port Arthur Board of Trade v. Abilene & Southern, et al. Opinion by Chairman Clark:

The rate on cotton from Texas common point territory to Galveston and Port Arthur, Tex., for export is 52½ cents per 100 lbs., which includes 1½ cents for wharfage. To Texas City, at which port wharfage is free, the rate is 51 cents. The complainant contends that there is no charge for wharfage at Port Arthur; that the inclusion of 1½ cents therefor in the rate is unreasonable and unjustly prejudicial against Port Arthur; and prays that the defendants be required to establish and maintain to Port Arthur a rate of 51 cents as they now do to Texas City. The commission decided that the circumstances at Port Arthur are clearly distinguishable from those existing at Texas City; that there is a wharfage charge of 1½ cents at Port Arthur, which is included in the published rate and is paid by the shipper. That complainant's plea that with equal rates Port Arthur can not compete with Galveston and Texas City confesses the natural disadvantages of Port Arthur as compared with the other ports. It is not the province of the commission to adjust rates for the purpose of equalizing natural disadvantages; neither may carriers lawfully do so. Unjust discrimination by carriers can not be predicated upon their failure or declination to remove by preferential rates, services, or privileges the natural disadvantages of location under which one community rests in competition with another more favorably situated. The record does not show any unjust discrimination against Port Arthur in the present adjustment of rates. The complaint was dismissed. (27 I. C. C., 388.)

The New England Investigation.

In re rates, classifications, regulations, and practices of carriers. Opinion by Commissioner Prouty:

This proceeding, undertaken in consequence of numerous and persistent complaints touching general railroad conditions in New England, was instituted under the commission's general authority to investigate and report. Discussion of the matters contained in the large record entered into and the following findings made:

While there is room for improvement, New England should be well satisfied upon the whole with the passenger service of the New Haven and the Boston & Maine lines. Safety of operation has not been considered.

The freight service upon the New Haven is inferior to what it should be, although fairly comparing with that in other sections where conditions are substantially the same. The freight service upon the Boston & Maine during the period covered was extremely poor, and justified in a great measure the criticisms it received; but a very earnest attempt is being made to correct these conditions which has already produced results.

The local freight rates of New England are slightly higher than, but on the whole compare favorably with, the average in Official Classification territory; they are lower than those in other parts of the country, except the commission-made rates in certain states. The long-distance rates are lower from and to New England than from and to any other section. Its passenger fares have been more favorable to the local traveling public than in any other portion of the United States.

The outside financial operations of the New Haven for the last nine years have been wasteful in the extreme, and the methods by which those operations have been conducted are unnecessarily involved and complex. While expenditure on its road and equipment has been with a free hand, there is nothing to show that it has not been wisely made, and much to indicate that the result has fully justified the outlay. The financial condition of this company calls for careful consideration and prudent action, but gives no occasion for hysteria.

As bearing upon the proposition that the rates of transport-

tation upon the Boston & Maine should be advanced, the financial condition of that company is analyzed and the reasonableness of its leases considered.

In discussing the remedy for present conditions in New England the following matters are considered: Steamship and trolley lines; the Boston & Albany agreement; the dissolution of the Boston & Maine and New Haven merger; an advance in rates upon the Boston & Maine.

In the opinion of the commission the following propositions lie at the foundation of all adequate regulation of interstate railroads: (a) Every interstate railroad should be prohibited from expending money or incurring liability or acquiring property not in the operation of its railroad or in the legitimate improvement, extension, or development of that railroad. (b) No interstate railroad should be permitted to lease or purchase any other railroad, nor to acquire the stocks or securities of any other railroad, nor to guarantee the same, directly or indirectly, without the approval of the federal government. (c) No stocks or bonds should be issued by an interstate railroad except for the purposes sanctioned in the two preceding paragraphs, and none should be issued without the approval of the federal government. (27 I. C. C., 560.)

STATE COMMISSIONS.

The governor of New York has appointed Charles J. Chase, a member of the Public Service Commission, Second district, in place of C. N. Douglass; and William E. Leffingwell, in place of Frank W. Stevens. Mr. Chase is a locomotive engineman of the New York Central, and lives in Croton. Mr. Leffingwell is proprietor of a hotel and resort at Watkins.

The Illinois Railroad and Warehouse Commission has issued an order, under the long and short haul section of the Illinois railroad act, in which the railways in the state having the long line or route between two common points are granted authority to continue and establish between such points the rates concurrently published by the shorter line, without affecting the rates to or from intermediate points on the long line. The commission further ordered that no advance in rates to intermediate points shall be made without its permission.

COURT NEWS.

Judge Wolverton of the United States court at Portland, Ore., has signed a decree in the Oregon & California land grant case which forfeits to the government 2,075,616 acres of land in the Willamette valley held by the Southern Pacific Company. The decree of forfeiture is based on the failure of the Oregon & California Railroad Company, and its successor, the Southern Pacific, to sell the land to settlers under the conditions prescribed by the grant. It is understood that the case will be appealed to the Supreme Court.

ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.—The Electrification Committee has been meeting frequently to arrange details of the scheme. Among the principal questions considered have been those in connection with the bonding of the rails for the transmission of electrical energy, the provision of the requisite number of carriages suitable for electric traction, and the structural alterations in the bridges on the route. A commencement has been made with the construction of the loop line to the site of the new power house to be erected.

PROPOSE CHINESE LINE.—A line is proposed in Northern Kiangsu province, China, which will connect Kaifeng with some seaport. Originally it was intended to have a port at Haichow. The line would from there run through Hsuechow-fu, Kiangsu, and Kaifeng, in Honan province. This is the first section of the Lanchow Railway, destined to be one of the longest trunk lines in China. At Hsuechow-fu, it will effect a junction with the Tientsin-Pukow Railway, and at Kaifeng, with the Peking-Hankow Railway, thus making northern Kiangsu accessible to the interior provinces. The economical advantages to northern Kiangsu in this respect cannot be over-estimated, because with efficient means of communication, great developments will take place.

Railway Officers.

Executive, Financial and Legal Officers.

Arthur P. Foss, assistant comptroller of the Maine Central at Portland, Me., has been appointed comptroller.

J. W. Wise has been appointed freight claim agent of the St. Louis Southwestern, with office at St. Louis, Mo.

W. H. Burns, general auditor of the Chicago, Rock Island & Pacific, with headquarters at Chicago, will hereafter also have jurisdiction over the Malvern & Camden.

W. W. Brown has been appointed general attorney of the Missouri, Kansas & Texas for Kansas, with headquarters at Parsons, Kan., succeeding John Madden, resigned.

Avery Turner of Amarillo, Tex., and G. H. Schleyer, vice-president and general superintendent of the St. Louis, San Francisco & Texas, have been appointed receivers of that road.

Frank Andrews, of the firm of Andrews, Ball & Streetman, of Houston, Tex., general counsel for Texas of the St. Louis, Brownsville & Mexico, has been appointed receiver of that road.

T. C. McCampbell has been appointed acting auditor and acting treasurer of the Tennessee, Kentucky & Northern, with headquarters at Nashville, Tenn., succeeding W. H. Thompson, resigned.

Felix Jackson, formerly president and general manager of the Houston & Brazos Valley, has been elected vice-president; George C. Morris, treasurer, and E. R. Cobb, secretary; all with headquarters at Freeport, Tex.

L. E. Hodson has been appointed assistant freight auditor of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., in place of W. H. O'Neill, assigned to other duties. Effective July 1.

G. A. McFarland has been appointed freight claim agent of the Wabash, with headquarters at St. Louis, Mo., succeeding C. H. Newton, resigned to engage in other business. Mr. McFarland has been chief clerk in the general traffic department.

W. C. Nixon and W. B. Biddle have been appointed receivers of the St. Louis & San Francisco, succeeding B. L. Winchell, resigned. Mr. Nixon and Mr. Biddle, whose headquarters are at St. Louis, Mo., will continue to perform the duties of chief operating officer and chief traffic officer, respectively.

J. J. McEwen, Jr., formerly auditor of the Orange & Northwestern, and later assistant to the auditor of the New Orleans, Mobile & Chicago, at Mobile, Ala., has been appointed auditor of disbursements of the Missouri, Kansas & Texas Railway of Texas, with office at Dallas, Tex., succeeding G. W. Danner, resigned.

C. S. Mellen, president of the New York, New Haven & Hartford and subsidiary lines, has resigned the presidency of the Boston & Maine and the Maine Central. Morris McDonald, vice-president and general manager of the Maine Central, at Portland, Maine, will succeed Mr. Mellen as president of these two roads. See a statement given out by the company in Railway Financial News.

Operating Officers.

P. N. Place, acting superintendent of the Scranton division of the Delaware, Lackawanna & Western, at Scranton, Pa., has been appointed superintendent.

George S. Hobbs, second vice-president and comptroller of the Maine Central at Portland, Me., has been appointed general manager. (See Executive, Financial & Legal.)

Kepler Johnson has been appointed trainmaster of the third district Indian Territory division of the Rock Island Lines, with office at Haileyville, Okla., succeeding D. Van Hecke, transferred.

James T. Colbert, assistant trainmaster of the Pittsburgh, Shawmut & Northern, at St. Marys, Pa., has been appointed superintendent of car service, with office at St. Marys, and the duties of trainmaster will be assumed by the assistant superintendent until further notice.

T. G. Smith, formerly division engineer of the Smithville division of the Missouri, Kansas & Texas at Smithville, Tex., has been appointed superintendent of the Houston & Brazos Valley, with office at Freeport, Tex., succeeding E. E. Hanna, transferred. The headquarters of the latter road have been removed from Velasco, Tex., to Freeport.

J. B. Carothers, assistant to the general superintendent of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, has been appointed assistant to general manager of both these roads. H. B. Voorhees, general superintendent, is now in charge of the Cincinnati, Hamilton & Dayton and the Cincinnati Terminal division of the Baltimore & Ohio Southwestern, with headquarters at Cincinnati, and R. N. Begien, assistant general superintendent of the Baltimore & Ohio at Baltimore, Md., has been appointed general superintendent of the Baltimore & Ohio Southwestern, exclusive of the Cincinnati Terminal division, with headquarters at Cincinnati. A portrait of Mr. Carothers and a sketch of his railway career were published in the *Railway Age Gazette* of June 20, 1913, page 1589, and a portrait and sketch of Mr. Voorhees were published on May 10, 1912, page 1073.

R. N. Begien, who has been appointed general superintendent of the Baltimore & Ohio Southwestern, exclusive of the Cincinnati Terminal division, with headquarters at Cincinnati, Ohio,



R. N. Begien.

was born in New England, and was educated at the Engineering School of Harvard University, having been a member of the class of 1897. Mr. Begien went to Central America, and for three and a half years was a member of the Nicaragua Canal Commission. Resigning from that position he went to South America, and for a year was a railway engineer in Ecuador. He then returned to the United States to enter the engineering department of the District of Columbia. In August, 1902, he was appointed assistant engineer of the Baltimore & Ohio, with office at Somerset, Pa.,

and in June, 1908, became division engineer at Philadelphia. He was appointed assistant to engineer of the same company, with office at Baltimore, on May 1, 1910, under A. W. Thompson, and when Mr. Thompson became general manager he remained as his assistant. He was made assistant to third vice-president on May 1, 1912, and the following December was appointed assistant general superintendent, which position he held at the time of his recent appointment as general superintendent of the B. & O. S. W. as above noted.

Traffic Officers.

E. R. Cobb, auditor of the Houston & Brazos, has also been appointed general freight and passenger agent, with headquarters at Freeport, Tex.

L. E. Johnson, agent of the Missouri, Kansas & Texas, at Bartlett, Tex., has been appointed traveling freight agent, with headquarters at Denison, Tex.

F. S. Franklin, freight solicitor of the Pennsylvania Railroad at Buffalo, N. Y., has been appointed district freight solicitor, with headquarters at Easton, Pa.

C. W. Woods has been appointed industrial agent of the Vandalia, with headquarters at St. Louis, Mo. Mr. Woods has been chief clerk to the general manager.

C. C. Lay has been appointed traveling freight and passenger agent of the Illinois Central, with headquarters at San Antonio, Tex., to succeed R. F. Bowes, promoted.

M. B. Hatfield has been appointed commercial agent of the St. Louis Southwestern at Paragould, Ark., succeeding J. A. Morgan, resigned to accept service elsewhere.

C. C. Dana has been appointed industrial commissioner of the Atchison, Topeka & Santa Fe, with office at Chicago, in place of Wesley Merritt, resigned; effective July 1.

Charles H. Freeman, commercial agent of the Norfolk & Western at Toledo, Ohio, has been appointed foreign freight agent at Norfolk, Va., succeeding W. T. Payne, deceased.

L. J. Cox has been appointed tax commissioner of the Texas lines of the Southern Pacific, and M. A. Westcott has been appointed right of way agent of the Louisiana lines, both with headquarters at Houston, Tex.

J. L. Manion has been appointed contracting freight agent of the Illinois Central, with headquarters at Evansville, Ind. W. B. McConnico has been appointed traveling freight agent, with office at Baton Rouge, La.

G. C. Toye has been appointed general freight and passenger agent of the Tennessee, Kentucky & Northern, with headquarters at Nashville, Tenn., succeeding W. H. Thompson, resigned. (See Executive, Financial & Legal.)

L. G. Lucia has been appointed division freight agent of the Chicago & Eastern Illinois, with headquarters at Salem, Ill., in place of F. E. Webster, who has been appointed chief of the tariff bureau, with office at Chicago.

D. L. Ewing, assistant general freight agent of the St. Louis & San Francisco at St. Louis, Mo., has been transferred to Kansas City, Mo., in a similar capacity, succeeding E. F. Edgcomb, who has been appointed commercial agent at that place.

C. A. Hayes, freight traffic manager of the Grand Trunk at Montreal, Que., has been appointed general traffic manager of the Intercolonial and the Prince Edward Island railways, with office at Moncton, N. B., succeeding E. Tiffin, assigned to other duties.

B. L. Winchell has resigned as one of the receivers of the St. Louis & San Francisco to become director of traffic of the Union Pacific system, with headquarters at Chicago, effective July 14. A portrait and a sketch of Mr. Winchell's career appear elsewhere in this issue.

C. E. Dewey, general freight agent of the Grand Trunk Pacific and the Grand Trunk Pacific Coast Steamship Company, Ltd., at Winnipeg, Man., has been appointed freight traffic manager of the Grand Trunk, with headquarters at Montreal, Que., succeeding C. A. Hayes, resigned.

George W. Smith has been appointed traveling freight agent of the Atchison, Topeka & Santa Fe, with headquarters at Ft. Madison, Iowa, succeeding J. W. Munsell, who has been appointed division freight agent, with office at Ft. Madison, Iowa, in place of C. C. Dana, promoted. Effective July 1.

The jurisdiction of George H. Lee, general passenger agent of the Chicago, Rock Island & Pacific, with headquarters at St. Louis, Mo., has been extended over the Malvern & Camden. J. E. Johanson, assistant general freight agent of the former road, with headquarters at Little Rock, is appointed also general freight agent of the Malvern & Camden.

C. H. Patterson, soliciting freight agent of the Norfolk & Western at Columbus, Ohio, has been appointed traveling freight agent, with headquarters at Columbus, succeeding O. W. Cox, promoted. Clifford B. Horsman succeeds Mr. Patterson, and P. C. Hodges has been appointed commercial agent at Toledo, Ohio, succeeding C. H. Freeman, promoted.

George W. Hayler, assistant general passenger agent of the Delaware, Lackawanna & Western at New York, having resigned, his former position has been abolished. Charles K. Rath, division passenger agent at Newark, N. J., has been appointed general agent, passenger traffic department, with office at New York, and J. L. Homer, city passenger agent at New York, has been appointed division passenger agent for New Jersey, with office at Newark.

A. E. Rosevear, assistant to vice-president of the Grand Trunk at Montreal, Que., has been appointed general freight agent of the Grand Trunk Pacific and the Grand Trunk Pacific Coast

Steamship Company, Ltd., in charge of Port Arthur, Ont., and the territory west of that place, with headquarters at Winnipeg, Man., succeeding C. E. Dewey, who has accepted service with the Grand Trunk, and R. J. Foreman, assistant general freight agent at Winnipeg, will succeed Mr. Rosevear.

Engineering and Rolling Stock Officers.

A. G. Andrew has been appointed assistant supervisor, of division No. 30, Pennsylvania Railroad, with office at Barnesboro, Pa., succeeding G. C. Smith, promoted.

The jurisdiction of C. A. Morse, chief engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, is extended over the Malvern & Camden, effective July 1.

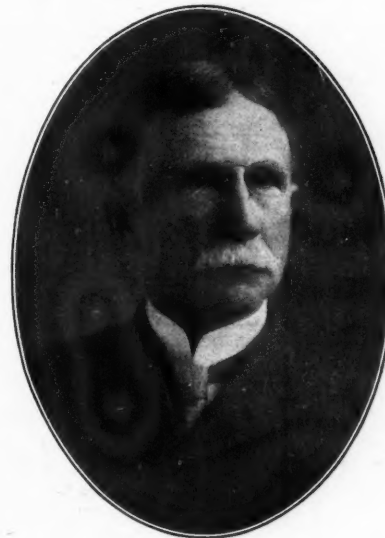
J. W. Orrock, division engineer of the Canadian Pacific at North Bay, Ont., has been appointed principal assistant engineer, with office at Montreal, Que., succeeding C. B. Brown, resigned.

Collingwood B. Brown, principal assistant engineer of the Canadian Pacific at Montreal, Que., has been appointed chief engineer of the Intercolonial and the Prince Edward Island railways, with office at Moncton, N. B.

H. Montgomery having resigned as superintendent of motive power and equipment of the Bangor & Aroostook, that position has been abolished, and R. Q. Prendergast has been appointed mechanical superintendent, with office at Milo Junction, Maine.

W. L. Ekin, division engineer of the Michigan division of the Vandalia at Logansport, Ind., has been appointed division engineer of the St. Louis division, with headquarters at Terre Haute, Ind., succeeding R. K. Rochester, promoted. H. C. Johnson, division engineer of the Peoria division at Decatur, Ill., succeeds Mr. Ekin. Mr. Johnson is succeeded by A. S. Bland, assistant division engineer of the Pennsylvania Lines west of Pittsburgh at Chicago.

Joseph Thomas Richards, whose appointment as consulting engineer of maintenance of way, of the Pennsylvania Railroad, was recently announced in these columns, was born near Rising



J. T. Richards.

Sun, Cecil county, Md., on February 12, 1845, and was educated at West Nottingham Academy. He entered the service of the Pennsylvania Railroad in August, 1869, as rodman and transitman at Altoona, Pa. In June of the following year he was appointed supervisor main line, Harrisburg to Newport, and from October, 1871, to March, 1873, was chief engineer construction and superintendent of various minor railroads in Maryland. He was then chief of locating engineers, making several surveys over the Allegheny mountains for an outlet for the Bedford & Bridgeport.

In May, 1874, he became mining engineer in the service of the Cambria Iron Company, Johnstown, and returned to the service of the Pennsylvania Railroad in March, 1875, as supervisor on the main line from Newport to Granville. About a month later he was promoted to assistant engineer, maintenance of way, and from June, 1877, to March, 1883, was principal assistant engineer of the United Railroads of New Jersey division, and then, for over two years was assistant to the chief engineer, becoming assistant chief engineer Pennsylvania Railroad on June 24, 1885. When a change was made in the organization in March, 1893, he became engineer of maintenance of way, and on June 1, 1903, was made chief engineer of maintenance of way, which position he held until his appointment on June 17, as consulting engineer of maintenance of way of the same road, as above noted. In addition

to his duties as head of the maintenance of way department of the Pennsylvania Railroad system east of Pittsburgh and Erie, Mr. Richards was chairman of several committees for working out the plans for the New York and Washington stations and yards.

Charles Hansel, M. Am. Soc. C. E., consulting engineer, 43 Exchange Place, New York, has been appointed consulting valuation engineer for the Pennsylvania Railroad, the Pennsylvania Company and the affiliated lines of the Pennsylvania system. His appointment as a member of the committee of engineers to confer on behalf of the railroads, with the Interstate Commerce Commission and its board of engineers relative to the valuation of railroads, was noticed in the *Railway Age Gazette* of July 4, page 18.

W. R. Trowbridge, assistant supervisor on the New York division of the Pennsylvania Railroad, has been appointed supervisor on the Trenton division; R. P. Koons, assistant supervisor on the Maryland division, has been transferred to the New York division; E. L. Hoopes, assistant supervisor on the Trenton division, has been transferred to the Maryland division; E. H. Armsby, assistant supervisor on the Bellwood division, has been transferred to the Trenton division, and R. H. Hellicf, transitman in the office of the engineer of maintenance of way, has been appointed assistant supervisor on the Bellwood division.

William D. Wiggins, superintendent of the Peoria division of the Vandalia at Decatur, Ill., has been appointed valuation engineer of the Pennsylvania Lines West of Pittsburgh, with headquarters at Pittsburgh, Pa. Mr. Wiggins was born April 28, 1873, at Richmond, Ind., and was graduated from Rose Polytechnic Institute at Terre Haute, Ind., in 1895. He began railway work in September of that year with the Pennsylvania Lines West, and was successively assistant on engineer corps and assistant engineer of the Pittsburgh division until June, 1901, when he was made engineer maintenance of way of the Cincinnati & Muskingum Valley division at Zanesville, Ohio. The following October he became engineer maintenance of way of the Cleveland & Marietta division at Cambridge, Ohio, and from May, 1902, to January 25, 1904, he held a similar position on the Toledo division at Toledo, Ohio. He was then promoted to engineer maintenance of way of the Pittsburgh division at Pittsburgh, Pa., where he remained until November, 1912, when he was appointed superintendent of the Peoria division of the Vandalia.

Purchasing Officers.

J. F. Marshall, whose appointment as manager of purchases and supplies of the Chicago & Alton, with headquarters at Chicago, has already been announced in these columns, was born at Tabor, Iowa, in 1869. He was educated in the high school at Tabor, and began railway work in 1889 with the Union Pacific. For about three years he was in the general freight agent's office at Council Bluffs, Iowa, and in 1893 became chief clerk to the general foreman of the locomotive department of the Chicago, Burlington & Quincy at Council Bluffs. Five years later he was transferred to the supply department of that road at St. Joseph, Mo., and in 1903 he was appointed storekeeper at Centerville, Ia. Two years later he was made general foreman of stores at Aurora, Ill., and in February, 1907, he left the Burlington to become general storekeeper of the Wheeling & Lake Erie at Cleveland. Mr. Marshall was promoted to purchasing agent of that road in 1910, which position he held until his appointment on July 1 as manager of purchases and supplies of the Chicago & Alton, as above noted.

OBITUARY.

Alexander Brown, signal engineer of the Chicago, Milwaukee & St. Paul, died at his home in Milwaukee, Wis., on July 7.

CHINESE RAILWAY EXTENSION DELAYED.—The proposed extension of the Peking-Mukden line, by a branch to Ichow and Chaoyang-fu from Chinchow-fu, is like many other propositions in China, being held up for want of money. The route has recently been surveyed, and estimates of cost of construction made, but patience will have to be exhibited by the engineers of the Peking-Mukden line, until the new parliament can settle down to business and see its way clear to vote the necessary expenditure.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE TREMONT & GULF has ordered 1 ten-wheel locomotive from the Baldwin Locomotive Works.

THE VIRGINIA & SOUTHWESTERN has ordered 3 locomotives from the Baldwin Locomotive Works.

THE SOUTHERN RAILWAY has ordered 15 mikado locomotives and 10 Pacific type locomotives from the Baldwin Locomotive Works.

AMSINCK & COMPANY, New York, have ordered 3 mogul locomotives and 1 prairie locomotive from the Baldwin Locomotive Works.

CAR BUILDING.

THE GEORGIA RAILROAD is building 4 coaches and 3 baggage cars at the company's shops.

THE SEABOARD AIR LINE has ordered 5 dining cars from the Pullman Company and is expected to order 10 coaches from the Pressed Steel Car Company in a few days.

IRON AND STEEL.

GENERAL CONDITIONS IN STEEL.—Orders for new business during the past week have been small. The United States Steel Corporation has been receiving orders at the rate of about 25,000 tons a day, comparing with between 25,000 and 30,000 tons per day in the corresponding period of last month. There have been no changes in prices and the mills continue to operate at almost full capacity. Orders on the part of the railroad are exceptionally small.

KAIFENG-HAICHOW RAILWAY, CHINA.—The Kaifeng-Haichow line is of great importance, as it will traverse a wide area, pass through two provinces, extending itself to Lanchow, capital of Kansu, on the one hand and join with the Tientsin-Pukow Railway and the Peking-Hankow Railway on the other. Another probable aspect of this line is that it will make the present unimportant Haichow into a useful seaport, and thus connect the interior with the ocean routes by a straight line. The value of Haichow as a terminus is much enhanced by its favorable situation. It is near the boundary line of Kiangsu and Shantung, and it is very near to Tsingtao. It is also within a comparatively short distance of Nagasaki.

ARGENTINE RAILWAYS FOR RENT.—A project will be taken into consideration by the Argentine senate, which authorizes the government to rent the state lines in accordance with the prescriptions of the bill. This provides that renting companies are to be of known solvency and have their legal domicile in the federal capital. The lines to be rented for a period of 60 years. Tenders will be called for. The company to which any particular line is rented must undertake to improve within a stated period the actual rolling stock and to place the lines in perfect condition, said works to be for account of the nation. It will be an essential condition of the contract that the renting companies shall construct for account of the nation any new lines that may be required. The territorial lines in the North are also to be included. At the same time the question of irrigation works will also be taken into consideration and it is probable that the government will be authorized to issue bonds to the value of \$100,000,000 for the construction of the numerous irrigation works throughout the country. This work is also to be given out. Both these projects are of vital importance. Dealing with the national railways, it is a well-known fact that their administration has always been a dismal failure and that those parts of the country which have had to rely upon this system for the transport of their goods have not made the same progress as other parts of the country which have been served by private railway enterprise.—*Review of the River Plate.*

Supply Trade News.

F. J. Lepreau has been made assistant western sales manager for the primary battery department of Thomas A. Edison, Inc., Orange, N. J., for Central Western territory, with office in Chicago.

The Chicago, Burlington & Quincy has ordered 1 scoop-wheel rotary snow plow from the American Locomotive Company, New York. The dimensions of the cylinders will be 18 in. x 26 in., and the diameter of the driving wheels will be 33 in.

Since January 1, 1913, the White Enamel Refrigerator Company, St. Paul, Minn., has furnished its all-steel collapsible bulkheads, hatch ventilators and plugs for the following railroads: Harriman Lines, 3,098 cars; Northern Pacific, 1,100 cars; Merchants' Despatch Transportation Company, 100 cars; Santa Fe System, 900 cars. It has also since this date furnished its Bohn tanks for the following cars: Louisville & Nashville, 100 cars; American Refrigerator Transit Company, 2,000 cars. The company has also received an order from the Illinois Central for Bohn tanks for 500 refrigerator cars, and from the Harriman Lines for 36 refrigerators, porcelain enamel lined, for the new dining cars which they are about to build. During the past 18 months the White Enamel Refrigerator Company of St. Paul has received orders for complete refrigerator equipment for the following Union stations: New York Central terminal, New York City; Grand Trunk Railway Union Station, Ottawa; Detroit River & Tunnel Company's new central station, Detroit, Mich.

TRADE PUBLICATIONS.

ELECTRIC HOISTS.—The Lidgerwood Manufacturing Company, New York, has published bulletin No. 12 on its electric hoists. This bulletin is well illustrated and includes concise descriptions and tables of sizes, etc.

UNIONS.—The Mark Manufacturing Company, Chicago, has published a small illustrated booklet on its Cold Drawn steel unions, which are intended to expand and contract in exactly the same degree as wrought pipes, with which they are used.

AUTOMATIC CONTROL OF MACHINE TOOLS.—The Electric Controller & Manufacturing Company, Cleveland, Ohio, has published a handsome illustrated booklet on the automatic control of machine tools, describing different kinds of control for different machines.

SECOND-HAND RAILWAY SUPPLIES.—The Walter A. Zelnicker Supply Company, St. Louis, Mo., has published in bulletin 139 a list of second-hand steam shovels, cars, locomotives, boilers, rails and other miscellaneous railway supplies which it has on hand. Prices are given.

FILES.—The Nicholson File Company, Providence, R. I., has published the eighth edition of File Philosophy. This edition, which has been revised, is illustrated and gives many hints regarding the proper method of using files and the various applications of the most common files.

SPEED REGULATORS.—The S. & S. Variable Speed Gear Company, New York, has published an illustrated folder on its Scriven speed regulators for machines. The folder includes sizes, capacities and prices, and tells of the saving in power that can be effected by the use of these regulators.

COMBINATION MACHINES.—The Wiener Machinery Company, New York, has devoted an illustrated booklet to descriptions of its Oeking solid steel frame triple combination punch, shear and bar and angle cutters and other combination machines for railroad shops and structural iron works. The bulletin includes interesting data, such as equivalent punching capacities, etc.

CONTRACTING.—The H. A. Strauss Company, Chicago, successor to the Falkenau Electrical Construction Company, has issued a booklet outlining the work the company is prepared to do in the capacity of consulting engineers, designing engineers, supervising engineers and general contractors. The booklet also contains brief illustrated descriptions showing features of some of its most important recent contract work.

Railway Construction.

CANADIAN PACIFIC.—An officer writes that a contract has been let to Foley Bros., Welch & Stewart, Winnipeg, Man., for constructing the five mile double track tunnel in the Selkirk mountains, on the Mountain subdivision. Work on the tunnel will be started at once, and it is estimated that it will take about three and a half years to complete this improvement. (February 28, p. 411.)

COPPER RANGE.—An officer writes that a contract has been given to the Phil. O. Sheridan Co., Houghton, Mich., to build a section of the connecting link under construction from the southern end of the Painesdale branch southwest to a connection with the main line at a point two and a half miles north of Toivola. The work calls for handling about 50,000 cu. yds. of earth to the mile.

ILLINOIS CENTRAL.—An officer writes that a contract has been given to Roper Bros., Memphis, Tenn., for double tracking work on the Yazoo & Mississippi Valley from Lake View, Miss., to Lake Cormorant, 7.8 miles. The Illinois Central contemplates building mechanical facilities at the Nonconnah, Tenn., yards. The latter work has not yet been definitely decided upon.

This company has let a contract to the Robert Grace Contracting Company of Pittsburgh, Pa., for grade reduction at Villa Ridge, Ill., including 700,000 cu. yds. of cut, the material from which will be used for raising the tracks from Villa Ridge south to Cairo, Ill.

LAUREL LIGHT & RAILROAD.—This company is building with its own forces from Laurel, Miss., southwest to Ellisville, seven miles. The grading work has been finished and it is expected that track-laying will be completed about September 1. The work includes constructing about 500 ft. of wooden trestles and a six-story office building. S. M. Jones and F. M. Meek, Laurel, may be addressed.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, will open bids on July 22, for the construction of an additional section of the Broadway subway in the Borough of Manhattan, New York, to be operated by the New York Municipal Railway Corporation under the new contracts. This section extends from Union Square north under Broadway to about Twenty-sixth street. There will be an express station at Union Square, and a local station at Twenty-third street, Madison Square. The commission now has under consideration bids which were opened on June 24, for the construction of a section immediately south of this one, extending from Union Square down to the end of the present construction at a point midway between Houston and Bleeker streets. (June 27, p. 1631.)

NORFOLK SOUTHERN.—The Raleigh, Charlotte & Southern has completed the extension from Varina, N. C., west to Colon, about 23 miles, and trains were run on July 1, from Raleigh to Mt. Gilead, 105 miles. The road is being extended from Mt. Gilead west to Charlotte, about 55 miles. A contract was given last year to Kennefick, Hoffman & Company, Charlotte, to build this extension. (See Raleigh, Charlotte & Southern, December 6, p. 1117.)

PEE DEE VALLEY.—An officer writes that contracts will be let in about six days to build from Kollock, S. C., north to Rockingham, N. C., 21 miles. The maximum grades will be 1 per cent., and the maximum curvature 4 deg. There will be five trestles on the line. The company expects to develop a traffic in lumber, factory products and farming produce. W. P. McRae is the promoter, and W. L. Gillespie, Cheraw, is interested.

RALEIGH, CHARLOTTE & SOUTHERN.—See Norfolk Southern.

ST. LOUIS & SAN FRANCISCO.—An officer writes regarding the report that an extension of the Empire branch is to be built to Panama, that this work has not been authorized. The company recently completed an extension of the Empire branch from Empire, Ala., to Sipsey, 4.92 miles. The work was quite heavy, and the line crossed the Sipsey fork of the Warrior river, where a through span of 220 ft. was put up. The Maryland Coal & Coke Company is developing a new mine at Sipsey, and the output of this mine will be carried over the new extension.

STANDARD COAL COMPANY'S LINES.—A contract has been given by this company to the L. R. Wattis Construction Company,

Salt Lake City, Utah, it is said, to build a two and one-half mile line between the company's coal mine in Spring canyon, Carbon county, and Storrs. The mine is three and one-half miles from Storrs, and it is planned to build a railway for two and one-half miles from Storrs and a narrow gage tramway over the other mile. F. A. Sweet, president; L. F. Rains, vice-president and general manager; George Payne, secretary and treasurer, Salt Lake City.

YAZOO & MISSISSIPPI VALLEY.—See Illinois Central.

RAILWAY STRUCTURES.

CHICAGO, ILL.—Articles of incorporation have been filed in Illinois by the Union Station Company, which proposes to erect a new passenger terminal to replace the old Union station at Canal and Adams streets. The capital stock named is \$50,000,000, of which one-fourth each is to be held by the Pittsburgh, Ft. Wayne & Chicago; Pittsburgh, Cincinnati, Chicago & St. Louis; the Chicago, Burlington & Quincy, and the Chicago, Milwaukee & St. Paul. The directors for the first year are Joseph Wood and J. J. Turner, vice-presidents of the Pennsylvania Lines; Darius Miller, president of the Chicago, Burlington & Quincy, and A. J. Earling, president of the Chicago, Milwaukee & St. Paul. The site proposed by the railways for the new station is between Clinton street and the Chicago river, Jackson boulevard and Adams street, but is not named in the articles of incorporation, because the applications of the roads for necessary ordinances are still pending before the Chicago city council.

HARTFORD, CONN.—An officer of the New York, New Haven & Hartford writes that the company has bought land on the West Side, just beyond the manufacturing section of Hartford. Tentative plans have been made for the improvement of this land, which is to be used as the site of a large freight yard for local freight. At the present time only a small freight house will be built, as the present freight business at Hartford does not warrant the completion of the plans at this time. The Canton street freight yards are being extended to provide room for about 350 cars additional.

MCADAM JUNCTION, N. B.—A contract has been given to Henry Post, Woodstock, N. B., at \$100,000 by the Canadian Pacific, it is said, for putting up new concrete and steel shops at McAdam Junction.

MONCTON, N. B.—The Intercolonial Railway will build extensions, it is said, to the present freight car shops at Moncton.

PHILADELPHIA, PA.—Terminal improvements are to be made in Philadelphia to include the removal of all grade crossings in South Philadelphia and a large increase to the port facilities, at an estimated cost of more than \$18,000,000, as agreed upon recently at a conference between city officers and representatives of the railroads. The city's share will amount to \$9,769,000; the Pennsylvania Railroad's, \$7,057,000, and the Baltimore & Ohio's, \$1,904,800. Plans in detail will be agreed on by the attorneys for the city and the railroads during the summer for submission to the city council in the autumn. The city will buy the railroad piers at Greenwich Point and Snyder avenue, and new freight yards and steamship terminals will be constructed on what is now marsh land adjoining the Philadelphia navy yard on the north. About 4,000 acres of marsh land will be reclaimed for home and factory sites. The present agreement is the result of twelve months of negotiations concerning the South Philadelphia grade crossing controversy that has been pending 25 years. The changes will have the effect of revolutionizing the facilities of the port, increase its belt line facilities so as to guarantee an indisputable "open door" for present or future railroads, and put the city in control of a mile and a half of undeveloped Delaware river front property now adjacent to the busiest section of the commercial port.

TORONTO, ONT.—Bids are wanted by B. Ripley, engineer of grade separation of the Canadian Pacific at Toronto, on July 12, for the construction of the substructure of a subway to be built at Yonge street, North Toronto.

WINOOSKI, VT.—An officer of the Central Vermont writes that a contract has been given to James E. Cashman, Burlington, Vt., for building the reinforced concrete arch and viaduct over the Central Vermont tracks, and the Winooski river at Winooski. The structure is to have a total length of 278 ft. 8 in., with a 93 ft. arch over the river. (June 6, p. 1245.)

Railway Financial News

BANGOR & AROOSTOOK.—A semi-annual dividend of 1 per cent. has been declared on the stock, payable July 8. This reduces the annual rate paid since 1906 from 4 per cent. to 2 per cent.

BOSTON & MAINE.—As noted in our elections and appointments column, Charles S. Mellen, president of the New York, New Haven & Hartford, has resigned as president of the Boston & Maine and as president of the Maine Central. A statement given out by the New Haven management says in substance: "This change in executive management [of the B. & M. and the M. C.] means nothing more than that Mr. Mellen will hereafter devote his entire time to the affairs of the New Haven and its direct subsidiaries, and that Mr. McDonald will handle the Boston & Maine and Maine Central railroads. The change does not mean any loss of interest in the affairs of the Boston & Maine and Maine Central by the New Haven. Mr. Mellen continues in the board of directors of both roads and as a member of the executive committees. It has been found impossible for one man to handle satisfactorily the three roads and do justice to each."

CAROLINA, CLINCHFIELD & OHIO.—William A. Read & Co., New York, have bought from the company and are selling privately \$350,000 5 per cent. equipment trust notes, series D, maturing in 14 semi-annual instalments beginning January 1, 1914. These notes were issued to pay for 500 steel underframe box and stock cars, on which the company paid \$81,000 cash.

CHICAGO GREAT WESTERN.—The protective committee for Wisconsin, Minnesota & Pacific first mortgage bonds, of which James N. Wallace is chairman, has notified owners of these bonds, of which \$5,187,000 have been deposited with the committee, that the Chicago Great Western has offered to buy the deposited bonds for \$500 first mortgage 4 per cent. bonds of the Chicago Great Western of 1909-1959, and \$500 preferred stock of the Chicago Great Western for each \$1,000 principal of the W. M. & P. bonds, and a total of \$123,740 in cash for the overdue coupons to be paid to the Central Trust Company, which is the depository for the protective committee.

MAINE CENTRAL.—See Boston & Maine, also Interstate Commerce Commission decisions.

NEW YORK, NEW HAVEN & HARTFORD.—See Boston & Maine.

ST. LOUIS & SAN FRANCISCO.—The *Commercial & Financial Chronicle* says that the only issues of the "system as recently constituted" which have failed to receive interest or guaranteed dividends are the Chicago & Eastern Illinois common and preferred certificates and the New Orleans, Mobile & Chicago first mortgage 5 per cent. bonds.

B. L. Winchell has resigned as receiver, as mentioned elsewhere in this issue, and W. C. Nixon and W. B. Biddle, both vice-presidents of the company, have been appointed receivers to succeed Mr. Winchell. T. H. West continues as a receiver.

The United States Senate has passed a resolution requiring the Interstate Commerce Commission to investigate the acquisition of the St. Louis, Brownsville & Mexico by the St. Louis & San Francisco.

SAN PEDRO, LOS ANGELES & SALT LAKE.—The California railroad commission has authorized the company to issue \$1,119,000 additional first mortgage bonds for betterments and improvements, and purchase of new equipment.

CHINESE RAILWAY EARNINGS.—The statement comparing receipts of various government railways in China for the past four years, affords striking evidence of the extraordinary movement which trade exhibited despite the disturbances caused by the revolution. Judging from the pessimistic reports which had been circulated there was every reason to believe that trade returns would either disclose stagnation or a backward tendency. The railway receipts show, on the contrary, that not only did the revolution not financially depress traffic, but that the earnings were increased. Every road except the Chuchow-Pingsiang Railway chronicled an increase over the average of the three previous years, and the total net increase for the whole system is over \$6,500,000.